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Pastoral Medicine

A Handbook for the Catholic Clergy

By
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NEW YORK
JOSEPH F. WAGNER

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CONTENTS

PAGE

INTRODUCTION 5

First Part

HYGIENE

I. AIR—GENERAL REMARKS 11
AIR AS A CAUSE OF DISEASE 14
WEATHER AND CLIMATE 17
II. SOIL AND DRINKING WATER 23
III. NUTRITION AND FOOD 28
FASTING AND ABSTAINING 32
FOOD 34
IV. DWELLING AND CLOTHING 47
CLOTHING 60
V. HYGIENE OF SCHOOLS 63
VI. THE INFIRMARY 71
VII. DEATH—ASPHYXY—SIGNS OF DEATH—MANNERS OF DEATH—BURIAL 74

Second Part

PASTORAL MEDICINE

THE RELATION OF MAN IN HIS BODILY CONDITIONS TO RELIGION AND MORALITY 87
I. PROCURATIO ABORTUS 88
II. BIRTH, CARE OF THE CHILD 92
THE CHILD AT SCHOOL AGE 97
III. MATRIMONY 98
IMPEDIMENTUM CONSANGUINITATIS 99
IV. CELIBACY 101

3344

PAGE

MAN IN SICKNESS 107

I. SOMATIC DISEASES 108
TUBERCULOSIS 117
DIPHTHERIA 118
CHOLERA 119
CHILDBED FEVER 120
APOPLEXY 121
DISEASES OF THE RESPIRATORY ORGANS . . . 122
DISORDERS OF THE HEART 123
ABDOMINAL DISEASES 123
ACCIDENTS 124

II. MENTAL DISEASES 124
MELANCHOLY 132
MANIA 134
RAVING MADNESS 135
MORBIDITY OF IMAGINATION 135
NERVOUS DISORDERS 141
EPILEPSY 141
HYSTERIA 144

III. DISEASES DUE TO OCCUPATIONS 149

IV. HYPNOSIS AND SUGGESTION 155

V. ALCOHOLISM 163

VI. MORPHINISM 172

Third Part

FIRST AID TO THE INJURED

I. HEMORRHAGE AND ITS TREATMENT 175

II. WOUNDS AND THEIR TREATMENT 180

III. SPRAINS, DISLOCATIONS, FRACTURES 184

IV. ARTIFICIAL RESPIRATION AND THE TREATMENT OF ASPHYXIA 187

V. POISONS AND THEIR TREATMENT 194

VI. INSENSIBILITY AND FITS 208

VII. BURNS, SCALDS, ELECTRIC SHOCK, REMOVAL OF FOREIGN BODIES FROM EYE, EAR, AND NOSE 215

VIII. THE TRANSPORT OF SICK AND INJURED 219

INDEX OF SUBJECTS 223

INTRODUCTION.

THE purpose of Pastoral Medicine is to present to the practical theologian facts of physical science, as developed by the medical profession, for the purpose of applying them in pastoral functions and in explanation and support of the teachings of faith and morals. Pastoral Medicine has for its object the treatment of some branches of the scope of pastoral labors, which, as a rule, are but sparingly, if at all, included in the clerical student's plan of studies.

In the intimate connection between body and soul, it seems necessary that the clergyman should have some knowledge of the conditions of the body, if he wishes to fill with best results the office of administrator to the soul. He requires this knowledge, furthermore, for the purpose of applying it to the proper care of his own body, and also to enable him to render judicious advice and practical assistance in cases of serious accident, when he may be on hand before the physician, and to offer counsel in the rational treatment of sickness where, in cases of emergency, a medical man is not immediately at hand. There must, therefore, be numerous instances when the knowledge gained from a course in Pastoral Medicine will be applicable to best advantage.

Anthropology is a science of modern times. It teaches the history of man, his origin and his place among living beings, the structure and functions of his body. The theologian, for the reasons referred to, is bound to be interested in the results of this field of research.

The relationship existing between medicine and theology also exists between the former and the science of law. When applied to jurisprudence, medicine teaches the aspect and influence of medical and physical facts for

the purpose of the administration of justice. In both instances medicine stands in the position of an auxiliary science. Medicine does not undertake to render a verdict in judicial matters, and Pastoral Medicine does not decide in points of faith and morals. Its task is merely to furnish *material* for the formation of a correct judgment. Nor has Pastoral Medicine anything to do with the healing of diseases as practised by the medical profession, though undoubtedly it may greatly help in the prevention of sickness and in establishing of proper hygienic conditions for the welfare of mankind.

The priest is, to a considerable degree, the teacher of the people. The people, as experience teaches, turn often to the priest for help and advice, not only in matters ecclesiastical, but also in questions of physical welfare.

To be able to give the advice proper in such instances the priest should be familiar, at least, with the fundamental principles of *hygiene*. The objection may be raised that hygiene does not properly belong to the scope of Pastoral Medicine, and that the necessary knowledge in this field might be obtained from popular scientific works. If this be true, it is also true that works of this kind are not always readily accessible, and that for various reasons the young ecclesiastic can not be expected to take up extensively this field of study.

In this country, moreover, some knowledge of hygiene is almost indispensable for the priest, who, for instance, is likely to be called upon to arrange for the building of a school, church, or other public edifice, with proper regard for hygienic conditions.

When treating of any branch of science or art we inquire into its development; its history. The development of Pastoral Medicine, in the sense as it is taken in this book, is of modern date. The connection between the

clerical and medical professions, however, is as old as the history of man.

Health is the highest of worldly possessions. It is, therefore, not surprising that mankind, when deprived of this possession, have at all times endeavored to regain health by all known and available means. In ancient times, when sickness was considered solely in the light of punishment from the deity, the priest, as mediator between the deity and the mortals, was called upon to combat the affliction by prayers, sacrifices, and conjurations. But soon the treatment of physical ills was made a profession and physicians appeared upon the scene. Among the Egyptians, the oldest civilized nation, the science of medicine was very early developed by their priests. Physicians were not allowed to depart from established methods of treatment. Each form of sickness had its special physicians. "Medical science with them," says Herodotus, "meant a physician was a healer only of one particular form of ailment and not for others, and there were plenty, and for all kinds of diseases. They had physicians for the eyes, for the head, for the teeth, for the stomach, and for other diseases." Egyptian physicians gained considerable reputation not only at home, but also in foreign countries, until the physicians of Greece proved to be their superiors. The most renowned among Greek physicians was Hippocrates, 460-364 B. C. It was he who first taught the observation of nature, the study and examination of the sick person. He also wrote books on medical and hygienic subjects. Soon after him philosophy regained the upper hand and medicine walked hand in hand with the systems and theories of the philosophers. Finally the science of medicine sank so low that in Greece as well as in Rome its practice was left to slaves.

We must linger for a moment with the Israelites.

Among the chosen people priests and Levites possessed much medical knowledge. It was their duty to pass judgment upon the cause and healing of leprosy, to undertake the religious treatment for the purification of women after childbirth, and to watch over the proper observance of the rules and regulations prescribed by the health authorities.

The Israelites very early had also a lay medical profession, who took payment for their services: "If men quarrel, and the one strike his neighbor with a stone, or with his fist, and he die not, but keepeth his bed: if he rise again and walk abroad upon his staff, he that struck him shall be quit, yet so that he make restitution for his work, and for his expenses *upon the physicians*" (Exod. xxi. 18, 19).

Let us now throw a glance upon the conditions existing at the time when Christianity appeared upon the scene. The Lord Himself performed many wonderful cures upon the afflicted, and always exercised His charity upon the sick and the weak. The first Christians, from the bishop down to the new convert, vied in their efforts to follow His example in taking care of the sick, the helpless, and the victims of persecutions.

As soon as Christianity was allowed a free field, there arose before the eyes of astonished heathenism an activity of Christian charity. There rose up in all large cities hospitals, where the sick were taken care of and the pilgrims found a home. Many holy Fathers, such as St. Basil, St. Ambrose, and St. Augustine, were founders of such institutions.

Medicine was practised in the spirit of Christian charity by clerics and monks. (J. Chrys. de Sacerdot. L. 3, c. 6.) The Augustinian monks were particularly renowned for their knowledge and skill in medicine. Also the Benedic-

tines of Monte Cassino practised medicine according to the doctrines of Hippocrates and Galenus. To these zealous clerical physicians we owe the preservation of many ancient manuscripts on medical science and practice, as the works of Hippocrates, Galenus, Celsius, and others.

In the early Middle Ages medicine was a favorite study of numerous ecclesiastics. Many of them made practical application of the results of their studies in convent, monastery, and at the sickbed, and as a consequence the pursuit of this work brought some of them into conflict with the dignity of their office.

Referring to this state of affairs the Cistercian monk Helinand (1227) complains: "*Ecce quaerunt clerici Parisiis artes liberales, Aureliani auctores, Bononiae codices, Salerni pyxides, Toleti daemones et nusquam mores.*"

We must not omit to mention the celebrated medical school of Salerno, where Greek, Roman, and even Arabian doctors obtained their knowledge. Desiderius, Abbot of Monte Cassino, who later became Pope Victor III., was a physician and instructor at this school toward the end of the eleventh century.

Digressions from studies proper to their vocation, by priests, finally caused the Church to proceed in a disciplinary manner. The council of Rheims (1131) forbade monks and priests to study and practise medicine for the purpose of revenue. Two councils at Montpellier (1162 and 1195) made this interdiction more severe. In the Decrt. Greg. lib. iii., tit. 4, we read, "*Sententiam sanguinis nullus clericus dictet aut proferat, nullus quoque clericus ruptariis vel ballistariis aut hujusmodi viris sanguinum praeponatur, nec ullam chirurgiae artem, Subdiaconus, Diaconus, vel Sacerdos exerceat, quae adustionem vel incisionem inducit.*"

Pope Innocent III., at the General Council of 1215, confirmed the prohibition of the practice of chirurgy by monks and clerics. A further proceeding, partly caused by the clerical occupation with medicine, is taken in the well known bull of Boniface VIII. (1300), in which excommunication is pronounced upon all those who undertook the dissection of a human body or the boiling of human bones. On account of these and similar severe measures, clerical physicians gradually became extinct.

Notwithstanding these misemployments, it was at all times a recognized fact that the ecclesiastic who devotes his work to the care of the soul, should take into consideration its habitation: the body, and, consequently, should not be without certain amount of medical knowledge.

It is not the purpose of Pastoral Medicine to teach or to induce the priest to take upon himself the task of the practising physician; it merely undertakes to enable him to advise and caution, to protect by hygienic and dietetic measures, himself and his flock against disease.

FIRST PART.

HYGIENE.

HYGIENE is that branch of medical science which occupies itself with the preservation and furtherance of health and sanitary conditions. In our own days hygiene has received considerable attention and advancement. It is clearly the fact that the prevention of sickness is more easily accomplished than its cure. Therefore great attention to this matter is being paid in all well regulated communities. England took the lead over all other countries in the diffusion of knowledge concerning hygienic conditions. Disraeli (Lord Beaconsfield) at a meeting in Manchester (England) maintained the importance of hygiene in the following language: "In my opinion, the establishing of sanitary conditions among our people is the one social question which stands above all others and which must command the primary attention of all statesmen and politicians irrespective of party. By providing wholesome habitations, pure drinking water, unadulterated food, and pure air we shall be enabled to secure the happiness and welfare of our people."

I.—Air.

1.—*General Remarks.*

The zone of gas which enwraps our terrestrial globe, and which moves with the globe's surface around its axis, we call the atmosphere. The layer of air nearest to the earth's surface is the most compressed, and, therefore, the heaviest. Farther removed from the earth the air becomes thinner and lighter. Since the atmosphere sur-

rounds all objects upon the surface of the earth uniformly and penetrates all vacuities, we do not feel its pressure.

The instruments with which we measure the *pressure* of the air are called barometers. The ordinary mercury barometer contains in its sealed long glass tube a column of mercury about thirty inches long. The air pressure upon the short, open arm of the barometer tube prevents the mercury from flowing out. If water were to be substituted for mercury, the column of water to hold the balance with the pressure of air would be greater in proportion as water is lighter than mercury. Putting the specific weight of water at = 1, that of mercury will be 13.59. By a simple computation we will find that the height of the column of water would have to be about 36 feet. In other words, air pressure will raise water about 36 feet. (As demonstrated in an ordinary pump.) We further learn from these physical laws that the atmospheric air of ½ square inch has a pressure of about 2.27 pounds. The force of atmospheric pressure diminishes with increasing elevation above the level of the sea. At an elevation of 17,000 feet the barometer will indicate hardly half the pressure that it will show at sea level.

Besides the mercury barometer, there are also used metal or aneroid barometers for the measurement of air pressure. The action of aneroid barometers depends on the varying pressure of the atmosphere upon the elastic top of a metallic box (shaped like a watch) from which the air has been exhausted. An index shows the variation of pressure. Though as regards the handier form, the greater durability and convenient carrying the aneroid barometer are preferable, yet it remains necessary for the purpose of correct measurements to compare it with the mercury barometer.

The *temperature* of the air is ascertained by thermometers.

Atmospheric air, the prime necessity of all organic life upon earth, has been shown to be essentially a mixture of nitrogen (79%), oxygen (20.96%), carbon dioxide (0.04%), some vapor of water and traces of ozone. This mixture is considered the pure, wholesome air, and remains nearly always the same under normal conditions. Of these component gaseous substances nitrogen is the least important in relation to hygienic considerations. It has no functions in the animal body and is merely a medium for diluting the oxygen. Oxygen is the gas indispensable for breathing and, therefore, for life. With each respiration oxygen mixes with the blood in the lung-cells and makes it bright red, arterial. The arterial stream of blood charged with oxygen penetrates into all, even the most remote parts of the body, and is active in all functions of life.

Ozone is a peculiar modification of oxygen. The most remarkable property of this agent is its oxidizing power. Pigments are easily destroyed by ozone, metals rust under its influence, moreover organic corpuscles of all kinds, contained in dust, in the air, as well as disease germs, are all oxidized and thereby rendered innocuous. Just as sure as you will find ozone in a fragrant pine forest, you will look for it in vain in the lanes of manufacturing towns or in crowded habitations.

Of the greatest influence upon hygienic conditions is the percentage of carbon dioxide in the air.

The principal cause for the existence of carbon dioxide is the respiration of human beings and animals. As explained above, oxygen enters into the blood with the air which we take into our lungs through the action of breathing. At the same time we expel in the reverse action of

the respiratory organs air laden with carbon dioxide. An adult emits by respiration carbon dioxide to the extent of about 25 quarts hourly.

A second cause for the presence of atmospheric carbon dioxide is the process of decomposition and decay, which takes place especially in manure and fertilized soil.

In the third place, the consumption of fuel in industrial centres furnishes a great amount of carbon dioxide. Finally there are subterranean stores of carbon dioxide which feed the atmosphere through the fissures of rocks and volcanoes.

This ceaseless supply of carbon dioxide is counterbalanced by a proportionate absorption. In regard to this point we must mention, first, the wonderful interchange between the animal and vegetable kingdoms. Green plants consume in daylight carbon dioxide, applying the same for the building of cells.

Atmospheric precipitations (rain) also absorb carbon dioxide, and, lastly, carbon dioxide is removed by the acids of salt water and by dispersing winds. The result is, that we find, as a rule, an equal percentage of carbon dioxide in the atmosphere (0.03-0.04%)

2.—*Air as a Cause of Disease.*

Experience teaches that air in the open, containing 0.05% of carbon dioxide, as is often the case in industrial centres, is hard to breathe for a length of time. In rooms air must be considered as bad and unfit for a continued stay for human beings, which, as a consequence of the breathing process of its occupants, contains more than 0.10% of carbon dioxide. To many people even a short stay in such rooms causes headaches, dizziness, or nausea. A continued stay in such rooms will cause poorness of blood and inclination to lung diseases. Good air in living

rooms, such as not to impair health, must not contain more than 0.07% of carbon dioxide.

The clergyman in his everyday life comes into frequent contact with air in closed rooms where many persons are breathing, such as churches, schoolrooms, and meeting rooms.

It is, therefore, necessary that such rooms, after having been vacated, be properly aired, and that free access should be given to the outer air while the rooms are occupied. In closed rooms, where many people congregate, and where fresh air is prevented from entering, there soon arises an unwholesome condition not only by overcharge of carbon dioxide, but also by excretion of the skin and the nature of the exhalation. The nose in normal condition is the best agent to discover such conditions. Apart from the danger from gaseous substances, the air may also cause disease by being charged with dust and bacteria.

In our towns the atmosphere is greatly defiled by the enormous mass of soot emitted from flues and chimneys. Smoke and soot consist of dense masses of carbon dioxide mixed with small particles of coal, which escape into the flue from the flames on account of incomplete combustion.

In industrial centres this admixture becomes so considerable as to make the air detrimental to the state of general health. Inflammation of the lungs often takes a fatal turn under such conditions. These impurities of the air are particularly injurious to those whose respiratory organs are delicate or already affected. Such individuals should, if possible, change their place of abode. Especially the clergyman whose lungs are subjected to a great strain in the discharge of his duties should be careful, where such conditions prevail.

Microscopic growths, called bacteria, which in our time have been discovered to be the cause of infectious diseases, form a very considerable part of the impurity of the air. These microorganisms stick to mineral dust particles and to minute fragments from clothing fabrics mixed with the air.

It has been known for some time that the agents which cause fermentation and decomposition are also microorganisms. If the development of these microorganisms is checked by the introduction of substances which are poison to them, then decomposition does not occur. These bacteria destroyers are known as conserving or antiseptic agents. The best known of them are carbolic acid, acetic acid, sublimate, salt in large quantities, etc. The careful and proper employment of such antiseptic agents serves to preserve articles of food in daily life. We stated above that bacteria are the origin and cause of contagious diseases. If a wound, infected with microorganisms or bacteria, as is the case with wounds due to accident, is treated with such antiseptic agents, festering of the wound and feverish conditions may be avoided. If not so treated suppuration and fever are the consequences. These malignant results of infection may also be avoided by the use of sanitary bandages after the wound has been properly cleansed and disinfected. The bandages will filter the air before it reaches the wound. Upon these principles rests the modern antiseptic treatment of wounds.

The least number of microorganisms are found in the air of the open country, entirely or almost free from human habitation, on high mountains, and also on the sea a distance from the shore. But even in populous districts the constant motion of the air causes such a dispersion of infectious microorganisms that the danger of catching disease by mere contact of air is only remote.

The deposition of these infectious microorganisms by the air is various. In the quiet air of the sick-room they settle upon the floor and the furniture. Infection by contact with air in the sick-room would be made more likely if dust was there allowed to gather, which through the moving about of patients, or through handling of beds, clothes, or furniture would rise and through inhalation enter the systems of those present.

3.—*Weather and Climate.*

The physical processes in the atmosphere produced by passing changes in temperature, air pressure, and lower or greater humidity of the air we call *weather*.

By *climate* we understand the average condition of a certain territory in regard to temperature, moisture, etc.

Weather and climate have always had a great influence upon the state of human health. Daily experience teaches, for instance, the influence of weather and climate upon catarrhal, pulmonary, rheumatic, digestive, and nervous ailments. We also know the healing power of some climates for certain diseases, for instance, of the mountain air for consumption. On the other hand, it must be mentioned that the benefit of climatic conditions is often greatly exaggerated for commercial purposes.

Let us now consider what connection there is between the temperature of the air and the state of our health. The human body, by the functions of life, produces warmth. For the purpose of health the own warmth of the body must not be below a certain degree. The blood heat of a healthy person is about 98° Fahrenheit. This warmth, produced by functions of the body, digesting of food, muscle and nerve activity, etc., is counterbalanced by certain causes of decrement, such as exudation, absorption by contact with cold objects, etc.

The natural factors producing warmth of the body are not always sufficient to keep it in normal condition. For this purpose clothing and dwelling are needed.

Excessive heat of the air causes an accumulation of heat in the body, which may call forth dangerous and sometimes acute manifestations of health disturbances, as observed in cases of heat prostration and sunstroke. In the first stage of heat prostration the face has a flushed appearance, the eyes are glassy; headache, dryness of skin, a burning sensation in the throat and hoarseness make their appearance. Soon dizziness, rapid action of the heart, trembling and fainting follow, until finally the afflicted collapses completely.

Treatment for persons prostrated from heat is as follows. Such a person should be taken quickly to an airy, cool place; tight clothing should be removed; face and head freely washed and cooled with cold water and ice bandages; refreshing and strengthening drink should be sparingly given. In serious cases, medical aid must immediately be summoned, because treatment will differ according to individual conditions.

It should be remembered that for the production of heat-prostration the high temperature of the air alone is not decisive. In dry and breezy air, no matter how high the temperature, or where abundant perspiration is obtained (Turkish or Russian baths), prostration will not result from great heat. It is most likely to happen in calm air of high temperature charged with a great amount of humidity, especially in a prolonged term of such weather. Such conditions are met with in the tropics, at the beginning of the rainy season, and also in some moderate climates during summer time.

The crowding of human beings in closed rooms, such as churches, classrooms, etc., is conducive to heat prostra-

tion, which, under such conditions, often appears in form of fainting spells. Light airy clothing, avoidance of strenuous exercise, the free drinking of pure water and other wholesome beverages, with absolute exclusion of all alcoholic liquids, are the best preventives against heat prostration.

Sunstroke, properly so called, differs from ordinary heat prostration by the fact that it is directly caused by the rays of the sun. It occurs in the tropics, and to guard against it travelers in those parts usually wear light, porous cork helmets, to which a linen cloth, protecting the neck, is fastened.

Besides these forms of disease directly due to high atmospheric temperature, there are others indirectly caused by the latter; for instance, cholera morbus, which affects the digestive organs and results not infrequently in death, especially among children. It is advisable to call in a physician for this ailment.

Regarding hygiene for hot days, Dr. Brouardel, honorary dean of the Paris faculty and former president of the Consulting Committee of Public Hygiene, has issued certain counsels of dietetic prudence for the dog days which may not be without their interest for American readers. He advises a sufficiency of solid food, with light vegetables, not highly seasoned, and avoiding fats and farinaceous diet. In liquids he urges hot as against cold drinks, and especially tea or coffee. If, however, cold drinks are insisted upon, coffee, wine diluted with water, and lemonade are best. Ice and alcohol are both tabooed. Apparently all the doctors in Paris were engaged in giving their views of " what to eat, drink, and avoid " during the heat wave. The opinions are various, but when they are collated, it is possible to arrive at some general conclusion. Lean meat—not much of it—fresh vegetables,

tea and coffee in any quantities, but no spirits on any pretence, as few iced drinks and as little alcohol generally as possible, seem to be about the regimen favored by the French medical men during hot weather, and common sense supports it.

The influence of low temperature upon the human body is, as a rule, without injurious consequences, if the body is properly protected and cared for. If this, however, is not the case, very low temperature may cause directly serious disturbances of health. Extremities become frost-bitten and gangrenous. In more aggravated cases the blood is forced into the brain and lungs, causing headache and difficulty of breathing. In the extreme stages of freezing there follow unconsciousness and death by paralysis of the vital organs. It is commonly known that frozen parts of the body must not be treated in warm rooms and by warm applications, but by rubbing with snow and ice water, in a cool place.

Ordinary variations of air pressure have not, as a rule, a direct influence upon human health. Indirectly these variations are of consequence, because upon them depend winds and precipitations, and the latter are in many ways the cause of disturbances of health, such as colds, etc.

Artificially increased air pressure, such as found in pneumatic caissons and in other apparatus used in bridge building, etc., causes a retarding and deepening of respiration; the blood is driven from the periphery to the inner organs of the body, and the hearing, speaking, and use of muscle are greatly impaired. The change from compressed to ordinary air should be very carefully made, as bleeding from nose and lungs may ensue, and even sudden death may result.

Diminished air pressure, as met with in high altitudes,

causes acceleration of respiration and pulse. In diminished air pressure in higher altitudes veins near the surface of the skin, for instance, of the nose, lips, and gums, may burst and cause bleeding of those parts. In very high altitudes dryness of the throat, difficulty in swallowing, thirst, dizziness, and headache are liable to occur. These diseased conditions are mostly observed in individuals not used to the living in high altitudes, and are generally called mountain sickness.

The variable humidity of the air has an influence upon our health, especially in connection with high temperature. The danger resulting from this connection has been demonstrated in our remarks on heat prostration. Moist, cold air is a powerful heat conductor, and takes much heat from the body. From this fact arises the uncomfortable feeling which we experience in air of that kind. In new buildings, not thoroughly dried, there is present a damp, cold air, causing rheumatism and diseases of the respiratory organs and kidneys.

Mentioning briefly the sanitary aspect of the various climates of the earth, we have to state that the climate in the polar regions is subjected to pronounced changes in accordance with the seasons of the year. During the winter the sun's rays are entirely absent; extreme cold prevails. Toward May the temperature rises, and attains its greatest warmth during July and August. Winter, with its death-like numbness of nature, its dreadful monotony, in connection with the prevailing dusk, produces, according to polar travelers, in most human beings an apathetic feeling and great depression of mind. Where a variety of food is lacking scurvy is of frequent occurrence—a sickness always accompanied by decomposition of the blood. Otherwise the sanitary conditions are comparatively favorable. Pulmonary consumption is hardly ever found

in Iceland, the Faroe Islands, and the northern part of Norway. Malignant diseases of the bowels and intermittent fever are almost unknown.

The climate of the temperate zone is, as a rule, free from excessive heat and a great degree of cold in its regular change of seasons. A difference must be made there, however, between the inland climate and the climate of the coast. There are also various conditions that have influence upon the climate of parts in the temperate zone, so that it greatly varies.

The tropical climate is distinguished by the regularity of its seasons. They do not differ there so much in degrees of temperature, but rather by conditions of drought, wind and precipitation (the rainy season).

The sanitary conditions of tropical regions are of increased interest to our clerics on account of the fact that a great number of their brethren are active as missionaries in tropical countries.

The prevalent diseases of the tropics are tropical anemia, diarrhea, dysentery, intermittent fever, and malaria. The latter is a most dangerous malady in tropical regions. The name itself, *mal-aria* (bad air), stamps the sickness as the product of the surrounding atmosphere. This bad air producing malaria is principally found in marshy grounds, low-lying river banks, and the mouths of rivers with brackish water. In spite of all dangers from the hot climate, there are found among northern people many individuals who successfully and continuously overcome these conditions. Lean, but healthy, men of normal quantity and quality of blood will, in the tropics, have the advantage over bloodless, inflated, fleshy and freely perspiring individuals.

II.—Soil and Drinking Water.

The soil, on which the human being lives, has a direct bearing upon the condition of the health.

It has at all times been a well known fact that certain localities have, for instance, been particularly favorable to the development of malaria. As shown before, these conditions always exist where stagnant water gathers on the surface of the ground, and where at the same time decaying organic, especially vegetable, matter is deposited. By the process of decomposition there are formed several kinds of gases which, heavier than the atmosphere, remain resting upon the surface. In such districts, it is, therefore, especially dangerous to lie down upon the ground to rest or to sleep. Intermittent fever is almost sure to be the result. A person resting on or near such ground is also exposed to the danger of being inoculated with malaria germs by the sting of insects. The health menacing condition of malarial soil may be ameliorated by drainage.

The mechanical properties of certain soil (clay and sand) have a faculty of absorbing and burying decomposed matter. With this faculty of the soil must be mentioned another fact, which plays a great part in the household of nature—it is the activity of microorganisms in the soil. Through them the carbon and nitrogen of organic matter become mineralized, i. e., they are changed into carbon dioxide and nitric acid. These again furnish indispensable food for the vegetable world.

The pores of the earth's surface are entirely, or to some extent, filled with air. This air in the soil is a continuation of the atmosphere, although it shows in its chemical composition a difference from atmospheric air. The air in

the ground is mixed with aqueous vapors; it contains larger quantities of carbon dioxide than atmospheric air and less oxygen.

In deep wells, in burial vaults, etc., there occurs sometimes a dangerous accumulation of carbon dioxide gases, which, upon sudden, incautious entering, cause poisoning. The best means for finding out whether a sufficient amount of breathing air is present in vaults, etc., is the lowering of a burning light. If the light dies away, it will be dangerous to go down without previously introducing a sufficient amount of fresh air. In sewers, tan-pits, and similar places, there is often present besides the carbon dioxide an accumulation of poisonous, sulphurated hydrogenic gases. Workmen who enter such places incautiously sometimes collapse, as if struck by lightning.

Ground air may enter dwellings if the cellar floor is not solidly cemented. This transmission becomes more likely when the pressure of the atmospheric air diminishes, the barometer falls, also when strong winds press upon the surface of the earth. The surface of the earth covered by houses is then not subject to the wind pressure and offers an escape for the compressed ground air. During the period of heating there is a further opportunity for the entering of ground gases into dwellings. The air in rooms becomes heated, and also lighter, and thus allows the cold ground air to rise. This efflux of ground gases may become extremely dangerous, when, owing to leaking pipes, illuminating gas has been allowed to saturate the soil. Under such conditions the gases penetrate the dwellings, unnoticed by the occupants, and cause poisoning.

Of much more hygienic interest than the underground air is the underground water. By underground water we understand those extensive accumulations of water which

constantly fill the pores and cavities of the earth. In porous soil an accumulation of water can only occur there, where a substratum of rock, clay, or lime prevents the water from penetrating into lower depths.

If underground water remains at certain seasons of the year near the surface, it causes a marshy condition conducive to malaria. If it rises to the surface only temporarily it will endanger the foundations of dwellings, penetrate into the basements, and, after abating, leave an abnormal moisture of the air, causing mold and offensive odor. If the underground water, however, is located at too great a distance from the surface of the earth, there arises a difficulty of obtaining water for drinking and other purposes.

In most cases it is this underground water which supplies us with the indispensable necessity of life, i. e., drinking water. If the underground water rises and emerges in a steady flow from the ground it is called spring water. Spring water is, as a rule, considered the best drinking water.

The geological conditions in most places are not such as to cause the underground water to emerge from the surface. The most usual way of providing drinking water is to sink a shaft well. The sinking of a well is of the utmost sanitary importance to households and institutions. Before we state, therefore, the hygienic demands, which must be made upon good drinking water, we have to explain the sanitary principles which should be followed in the sinking of a well.

The pure ground water of the well should be free from influxes of all foreign admixtures. To obtain this it is necessary to wall the well shaft with solid masonry.

The opening of the well at its surface should be so arranged that no impure water can flow into it. For the

same reason the top should be well covered. A ventilation of the shaft for the purpose of maintaining the salubrious quality of the water is not necessary. If the shaft is left open there is the danger of all kinds of injurious matter falling into it.

In the neighborhood of the well there must be no sewer-canals, dung heaps, or privies.

The question as to the distance that a well should be removed from a graveyard may sometimes present itself to the clergyman. As a general thing it is, from a hygienic standpoint, considered necessary to leave a distance of fifty yards between well and cemetery, particularly if the watercourse of the ground water comes from the direction of the latter. The formation of the soil into which the well is to be sunk is also worthy of earnest consideration if a cemetery is near. If the soil be porous limestone, then it is certain that there will not be good drinking water. If sunk in clay perforated with veins of sand, these veins are liable to carry dangerous matter from the cemetery into the well. It must, however, be mentioned that the danger from burial places for ground water is often exaggerated, not only through ignorance, but in our times also for the purpose of making propaganda for cremation. Only to the above mentioned extent would there be any danger.

In cities water should be provided from a natural or artificial reservoir and led through pipes into the houses. This system of providing water is of very high sanitarial importance, because the people are, through a liberal supply of water, induced to cleanliness. Besides, danger of contagion from infected water is removed and the refuse is effectively washed away through the sewers. From an economical standpoint, the centralized water supply in cities has the advantage of saving a great deal of man-

ual labor and making the extinguishing of fires more feasible.

If leaden pipes are used, as is commonly the case, there is danger of lead poisoning, and such actually occurs very frequently. The danger of metallic poisoning from drinking water exists particularly where the pipes are at times only partly filled, and where, consequently, air has access. Water which stands overnight in the pipes takes up a good deal of lead. In the morning this water should, therefore, be allowed to run off unused before water for drinking purposes is drawn from the pipes. Water containing lime or iron is not deteriorated by leaden pipes.

Finally we have to settle the question: What is good drinking water? The first hygienic condition is that drinking water should not become a cause of sickness.

There is danger of this when the water has a too high degree of hardness, which impairs digestion. Such water can not be used for cooking many kinds of food, such as pulse, tea, coffee, because of the indissoluble combinations which take place between the salts of lime in the water and the ingredients of these articles of food.

The hardness of water is caused by a considerable percentage of lime and magnesia.

The possibility of lead poisoning by pipe water has been already mentioned. Good drinking water should contain no trace of lead when it comes from the pipes.

Chemical analysis will give information in both cases.

Drinking water should further be, as far as possible, free of bacteria, as well of those that cause decomposition as of those which cause sickness. Microscopical as well as bacteriological examination carried out by experts will procure the necessary information.

The second hygienic demand to be put to good drinking water is that it should taste well and be appetizing.

Water will be satisfactory if it is without smell, colorless, and clear. Even harmless admixtures to drinking water will soon cause nausea and make the water unfit for use.

The taste of the water should be refreshing; every trace of a foul, moldy, and stale taste must be absent. These bad qualities are often discovered by the taste only after the water has been warmed.

The temperature of good drinking water should be from 45° to 55° Fahrenheit, throughout the whole year. Water of a higher temperature is not refreshing, and of a lower, injurious to the channels of digestion.

Finally, good drinking water should be obtainable in sufficient quantity. It is deemed sufficient if about seventy-five quarts per day and head of the population are available for all purposes. The minimum for consumption, by drinking and the preparation of food, has been found on ships to be two quarts per day and head.

III.—Nutrition and Food.

To keep our body in a healthy condition it is necessary to replace in our body the matter absorbed by the functions of life and exertions of labor. To cover the deficiency caused by these processes we take foods. Foods are divided into two main groups, *nitrogenous,* or proteid foods, i. e., those which contain nitrogen, and *non-nitrogenous,* i. e., those which do not contain nitrogen.

Nitrogenous foods (meat, milk, eggs, pulse) replace the consumption of the most important ingredient of the body albumen.

Non-nitrogenous foods embrace fats and carbohydrates, collectively called heat producers or respiratory foods. Fat is found in both the animal and the vegetable kingdom. All fat contained in the body is there in a liquid state.

Therefore, only such fats are acceptable for nutrition which become liquid at a degree of less than 105° Fahrenheit. Stearine, for instance, is absolutely indigestible, because it melts only at a much higher degree. Carbohydrates are organic compounds, containing carbon, hydrogen, and oxygen. They belong mostly to the vegetable kingdom, although also found in animals. To carbohydrates belong the various kinds of sugar and the starch in cereals.

Besides aliments, our body requires for the maintenance of its healthy condition a supply of water and salts in a chemical sense.

Water performs in the household of the body a number of important functions. As an agent of solution and for the moving of soluble substances it is of the greatest importance. It also plays a great part in the regulation of the heat of the body. Our body needs between four and five pounds of water every twenty-four hours, supplied partly by beverages, partly by solid food containing a percentage of water.

For all tissues, for all processes of diffusion, for the proper acting of the gastric juices a certain amount of salts must be an ingredient of our food—phosphates, sulphates, chlorides, and carbonates.

Food consisting only of albumen, fat, carbohydrates, water, and salts, would, however, be taken only with dislike. To overcome this there must be added a savoring. Under this designation we understand partly the relishable substances contained in the food or subsequently added to it (the relishable state of roasted meat, the flavor of fruit, of wine, of lemon, seasoning spices, such as pepper, mustard, etc.), partly articles indulged in for their stimulating effect upon the nervous system, like coffee, tea, alcohol, tobacco.

The importance of relishable food is found principally in the fact that it creates a desire to take nourishment. Human beings are most sensitive in this respect. Not only does the appearance of the food sometimes cause them to detest it, but their appetite is very easily dulled by a prolonged diet of the same food, prepared in the same manner. Man requires a variety in his food. This necessity has been discovered especially in educational and other institutions. Nothing is more abhorred, for instance, by the inmates of prisons than the monotonous bill of fare there prevailing. To the clergyman who may be called to act as a member of the Board of Administration of some hospital, orphan asylum or similar institution, the knowledge of this fact is of interest.

Among inmates of orphan or similar asylums a disease is frequently met with in which food plays an important part, namely, scrofula, a sister sickness of tuberculosis. In children of the tenderest age it is the cereal food which causes this disease, either by disturbing the process of transformation of matter in the body, or by creating conditions favorable to the disease, if an inclination to the same has been inherited. In larger children a cereal and potato diet favors a further development of scrofula.

In the diet of orphanages milk and meat should, therefore, play an important part.

In the diet of the sick we must make a distinction between the nourishment of patients in feverish condition and those who are convalescent. There is also a diet for people inclined to obesity, etc.

In former times the principle prevailed to prescribe dieting for every sick person. By this was understood the nourishing of the patients with thin, weak soups. The partaking of nourishing foods was considered harmful for patients. In our days, we know that the fever patient,

for instance, suffers an increased and accelerated change of matter in his body. Through the increased secretion of important substances during the fever, the weight of the body decreases rapidly. The nourishment of fever patients has for its task to give compensation for this waste, or to restrain it as much as possible.

In such diseases the use of fine flour, rice, and maltose is to be strongly recommended. By employing carbohydrates the decomposition of albumen will be greatly prevented. As the fever abates, albumen in easily digestive form, such as peptone, finely minced meat, or beef tea may be given.

As mentioned before, a healthy person needs between four and five pounds of water daily. The fever patient with his increased temperature needs even more, and it is a great comfort to him. After the crisis of the sickness has passed the convalescent needs more albumen for the production of muscle. As the digestive powers become stronger more carbohydrates and albumen should carefully and gradually be added to the food, and it may be given more frequently. Overloading of the stomach should be avoided, as it is an erroneous idea that a frail child or feeble patient can speedily be brought back to normal strength by the consumption of concentrated and rich food.

In contrast to the forms of diet having in view the maintenance or recovering of normal condition of the human body, there is the reducing diet for obese persons. The nutrition of our body does not intend the accumulation of fat. If such accumulation occurs in individuals, owing to predisposition or a faulty mode of life, it may easily become the cause of serious maladies. Excessive depositions of fat hinder the activity of the muscles, particularly of the muscles of the heart. They cause shortness of breath,

deterioration of the blood, and finally dropsical secretions into the cells and cavities of the body. A consumption of fat and carbohydrates, accompanied by sedentary habits, are most favorable for obesity. The oldest and best known cure for obesity is the one prescribed by the English physician Hardy for a patient of his, named Banting, hence called Banting cure.

Under this cure there are omitted from the food all substances of fat and carbohydrates. Only nitrogenous food is allowed, meat and little bread; beverages only in small quantity. Enforced exercise is an important part of the cure. This cure soon causes a distressing feeling of hunger, the digestion becomes impaired, the body becomes poor in albumen, and a general weakness follows.

Attempts to cure obesity by radical means, including diet, are always dangerous. A prudent, regular, and frequent exercise, and avoiding of luxurious food and drink are the most rational and safest cure. Like many other evils, obesity is more easily prevented than cured.

Fasting and Abstaining.

In sketching the physiologic-chemical aspect of the nutrition of the human body it will not be amiss to throw a side glance from a hygienic standpoint upon the law of the Church concerning fasting and abstaining. It is well known that the interpretation of this law is a very mild one, and one which takes in its enforcement considerable account of individual conditions. The reproach made against the Church for the enforcement of this law, therefore, arises more from a general disinclination to obey her laws than from other reasons. It is apparent that the observing of the law concerning the nutrition of the body must vary with the climate. Every ecclesiastical ordinary

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in charge will, therefore, before publishing an order of fasting, take into consideration local as well as social conditions among the people of his diocese.

From *fasting* are excused working people who, in the performing of their daily labor, are obliged to exacting bodily exertion. Exacting exertion is not only that accomplished by manual labor, but also that which requires great mental strain, for instance, close study. To this class should be counted especially theological students. For these young men there is great danger that their great zeal for observing the laws of fasting, while engaged in arduous studies, will lay a seed of physical infirmity, and, therefore, the superior of the institution should restrain them with a loving hand. While considering the status of the clerical profession, we must not forget to mention the orders and religious societies which have the nursing of the sick for their object. The nursing of the sick makes such heavy demands upon physical strength that any restriction in the matter of food is usually out of the question, if the individual is to perform his or her duties satisfactorily and without injury to self. Besides, a body with an empty stomach is exposed in an increased degree to the danger of infection.

The *abstaining* from flesh meat is of less importance for nutrition. It can be accomplished by almost everybody at the times when the Church demands it. Only the sick and convalescent, especially those suffering from stomach complaints and to whom fish and farinaceous food cause indisposition, may be entitled to dispensation.

From a hygienic standpoint the rule in the interpretation of the law of the Church should be: Liberality with regard to the law of *fasting* and strict observance of the law of *abstaining*.

Food.

After this diversion we now turn to the different kinds of food, and we will endeavor to state briefly the demands which hygiene makes upon them.

The first demand is that food must not become a source of disease; furthermore, it must be put upon the market unadulterated.

We will first take under consideration food obtained from the animal kingdom, i. e., meat, milk, and eggs. Meat, for our food, we obtain from domestic animals, also from wild fowl, game, and fish. Cattle furnish the principal supply, the foremost in value being the meat of beef.

Particularly tender, free from fat and easily digestible is the flesh of young fowl, wild or domestic. To soften the tough meat of wild fowl it should be soaked for some time in sour milk.

Veal contains more water and lime than beef. Taste and nutritious value depend upon the age of the animal and of the quality of its feed. Pork contains considerable fat and is harder to digest, yet it is a popular and favorite food among all nations. Horseflesh has a sickening, sweetish taste.

The meat of fish is mostly free from fat and, therefore, easily digestible; exceptions are the eel and salmon, which have large deposits of fat, and for that reason their meat is harder to digest.

It is well known that the quality of the flesh of cattle varies in accordance with the food they receive.

The consumption of meat is, under certain conditions, accompanied by considerable danger to human health, for instance, owing to animal parasites, as trichinae and tapeworms.

Trichinae are small, slender worms which in the larval state are parasitic in the muscles of the hog. If introduced, by the eating of raw or insufficiently cooked pork, in the human stomach the trichinae are liberated and rapidly become adult, producing large numbers of young, which find their way into the muscles and bowels, producing the disease called trichinosis. Another parasite may be acquired by the consumption of meat from a hog affected with pork measles. Such meat is filled with larvae of tapeworms, which will thus enter the human body and grow there. By eating raw beef another tapeworm may be acquired, larger and stronger than the one found in pork. Pork strongly affected by pork measles is of offensive appearance and unfit for use.

But it is not only from the parasites of the flesh of warm-blooded animals that we may acquire tapeworms; there is the same danger in the consumption of some kinds of fish, as, for instance, salmon, pickerel, etc.

Besides these parasites, certain diseases of cattle may be transferred into the human system by eating contaminated flesh. Such diseases are murrain, rabies, festering sores, and tuberculosis. Particularly the latter, occurring in cattle and hogs, is deserving of the closest attention in hygiene. This disease is not at all scarce in cattle. An investigation, conducted in the state of Saxony, proved that over eleven per cent. of the cattle killed there in public slaughtering houses were infected with tuberculosis.

The flesh and milk of tuberculous animals are doubtless more or less dangerous. The products from the milk of such animals, such as cream, butter, and cheese, retain the contagious qualities.

Slaughtered meat may be considered as dangerous to health if instead of a fresh bright red color it has a brownish, greenish, or very pale red color, or if, when

squeezed, there flows from it freely a discolored juice; if the fat, instead of hard and solid, is flabby and jelly-like; when the marrow of the hindquarter is not firm and of roseate hue, but soft and of a brownish color. Spoiled and tainted meat, moreover, emits an offensive smell. Sellers of meat, however, know how to remove this smell. It may, nevertheless, be detected by thrusting a knife, which has previously been dipped in hot water, into the meat. The knife when removed will retain and betray any bad smell that there may be in the meat. The quality of smoked ham may be proved in a similar manner by driving a clean nail into the meat right down to the bone. If, withdrawn quickly, the nail has a foul smell, the quality of the meat is suspicious.

To avoid the injury to which human health is exposed by the consumption of meat, special laws and regulations for the slaughtering of animals have been enacted since the earliest times. Moses and the writers of the Talmud allowed their people to slaughter only certain species of animals for the purpose of consumption, declaring all others unclean. The slaughter of animals was, moreover, subject to certain regulations.

Freshly slaughtered meat is not suitable for immediate consumption. It is tough and has a sickly, sweetish taste. After being properly kept for two or three days it develops an acid which renders it tender and fit for use.

Fresh meat is usually kept in ice houses. This mode of keeping meat is not as beneficial as it would first appear. The surface of the meat under ice treatment becomes thoroughly moistened and softened and offers in this condition a favorable place for the settlement of bacteria of decomposition. Meat kept in this manner, therefore, spoils very quickly after it is removed from the ice box and if not immediately used.

Much more rational is the hanging of meat in cold, moving air. Under this treatment a dry layer is formed on the surface and the bacteria of decomposition do not find a favorable place for settling. Experts in hygiene, therefore, recommend for the magazines of abattoirs the use of iced but dry air, kept in circulation by suitable means.

Care must also be taken to protect meat from flies, which cause maggots to develop in the meat, and may convey other infection dangerous to human health.

Since, under certain circumstances, a constant supply of fresh meat is difficult or impossible, methods had to be found to make it retain its good quality for a length of time, i. e., to preserve it. The principal requirements of the proper preserving of meat are that no injurious substances are brought into contact with it and that the nourishing properties and the flavor are not impaired. The methods most universally in use are salting, smoking, and canning. By impregnating meat with a strong solution of salt (8-12%) the bacteria of decomposition are prevented from settling and spreading. If meat thus salted is then dried in well ventilated rooms, and afterward smoked over a smoldering wood-fire, good results will be obtained and there will be no danger of infection by parasites (smoked ham, sausage). In contrast with this time-honored method of thoroughly smoking the meat, the modern method of rapid smoking is to be deprecated. By this method the meat is dipped into a compound of water, wood-vinegar, and juniper oil and afterward dried. This process does not kill certain parasites and bacteria, and the flavor of the meat is impaired.

The food next in importance to meat obtained from the animal kingdom is milk.

Milk is principally obtained from cows and goats. Goat

milk as a popular food is of great importance. It contains more fatty substances than cows' milk, but has less sugar. It should receive particular consideration. Its availability is increased by the fact that goats are easily and inexpensively obtained, their maintenance costs next to nothing, and they are hardly ever affected with disease.

The greatest supplier of milk is the cow, and the feeding and keeping of this animal are of great influence upon the quality of its milk. Insufficient feeding of milking cows, either with dry or green fodder, has as a consequence the production of watery milk, devoid of fatty substances. The kind of fodder itself is of equal importance. Poisonous herbs, such as meadow saffron or ranunculus, render the milk of animals, devouring them while grazing, detrimental to health, particularly to infants. Milch cows should be kept scrupulously clean, in well ventilated stables. Their bodies should be carefully cleaned every day, because experience teaches that a well groomed animal furnishes a superior quality of milk. Furthermore, proper care should be taken in the handling of the milk until it is put to use. Soon after it has been drawn from the udder it should be poured through a fine sieve to cleanse it of impurities, and should then be kept in cool rooms. Milk should not be kept in vessels of copper, brass or tin, nor in jars covered with cheap glazing or made of cast iron and lead enamel, as the milk easily absorbs injurious matters.

The place where milk is stored should not be in close vicinity to sleeping or sick rooms, and persons who are nursing patients afflicted with contagious diseases should not be allowed to handle milk. Milk is preeminently fitted to be a vehicle of the germs of contagious diseases. Cholera, typhoid, and scarlet fever have often been spread by infected milk. A mother who has just been attending

her child sick with scarlet fever, may convey germs of the disease to the milk handled by her and given to her other healthy children, who will imbibe these disease germs and very likely get the disease. Milk may also in other ways be the cause of the spread of contagious diseases. If the milk cans are washed with impure water containing disease germs they will adhere to the sides of the vessels, get into the milk and through it reach the consumer. The spreading of cholera and typhoid fever has been traced to this source.

Unscrupulous milk dealers injure the consumer's health by selling adulterated milk. The ordinary way of adulterating milk is by the adding of water. The defective quality of such milk is detected by the milk scale or by chemical analysis.

The most important ingredient of milk, cream, appears on the surface if the milk is allowed to stand without disturbance for about twenty-four hours. By the buttering process butter is obtained from the cream, the quality of which corresponds directly with the quality of the milk from which it is obtained, and with the care employed in its handling. After removing the butter there remains in the churn the buttermilk, which, in its fresh state, is a wholesome, cooling drink, containing considerable nourishment. Skimmed milk, though not as nutritious as unskimmed milk, is of no little value as a food and for household purposes.

Cheese, also a dairy product, is an excellent and rich food, containing much nitrogen, but not always easy to digest.

To the articles of animal food belong also the eggs. The component parts of an egg are about two-thirds water and for the rest pure albumen and fat in nearly equal portions. The fat is in the yolk, and gives it its yellow

color. Eggs contain none of the sugar principles, and should be eaten with bread or vegetables that contain them. Hard-boiled or fried eggs require longer time to digest than soft-boiled. The latter are, therefore, more wholesome.

We will now turn to the food obtained from the vegetable kingdom. In the first place, we must place under this head the food which is the most indispensable and most universally used food of all, i. e., bread. Bread is obtained from the flour of cereals mixed with water, with an addition of leaven or yeast, into a dough. Fermentation then takes place in the dough, changing part of the starch contained in the flour into sugar, alcohol, and carbonic acid. This latter causes the rising of the dough and gives to the bread its spongy condition, which alone makes it digestible. The kneaded and molded dough is then baked in the oven.

Good flour should be yellowish-white, and not of a red or bluish tint. It should have a dry, smooth, yet solid touch, and there should be no lumps in it. If a quantity is pressed together in the hand, it should give a crunching sound, and when released should readily fall apart. The flavor of the flour must not be moldy. Its taste should be sweet, not sour or offensively bitter. A grating sound of flour when taken between the teeth shows that it contains sand.

Flour becomes detrimental to health if the cereal from which it is obtained is tainted by certain fungous diseases. Rye bread often contains spawn of ergot, kernels of dark color a little larger than rye grain. Ergot is a fungus which settles as a parasite on the young rye grain, particularly in very wet seasons.

If the flour contains as much as 1-2% of ergot its use will cause a sickness called raphany. This sickness

caused in former times great loss of life, especially toward the end of the sixteenth and at the beginning of the seventeenth century. Even in our own time small epidemics due to ergot occur occasionally in damp regions, for instance, in the department of Sologne, in France.

If rye flour thus contaminated is mixed with pure water in a dish of white china, it will show a peculiar reddish-brown color, while pure rye flour will, under the same treatment, remain purely white. The impurity can also be detected by chemical analysis.

Another health-disturber, also of parasitic origin, is sometimes found in the flour of maize, or Indian corn. It causes a disease named pellagra and occurs frequently in northern Italy.

The fruit of leguminous plants, such as peas, beans, and lentils, are particularly rich in albumen. Potatoes contain principally starch-flour and water, with very little albumen. They are a favorite and indispensable food of the people, meeting adequately the demands of the body for hydrates of carbon. Some meat should necessarily be taken with them, because if albumen is not supplied from some source, a potato-diet will soon cause disturbed digestion.

Green vegetables are very valuable, owing to their palatableness and on account of the salts which they supply to the body. Their actual nutritious value is small, but they contribute to the easy digestion of other food, and they are a great help in the maintenance of good health in the organic body. Fresh fruit is wholesome on account of its agreeable taste and of the change in the diet which it offers. It is also of some nutritious value, which is determined by its contents of sugar. The agreeable taste is caused by fruit acids.

As explained before, civilized man craves for his nutri-

tion besides the actual means of sustenance also stimulants and articles to gratify the taste.

The first consideration among stimulants must be given to alcoholic beverages. The active principle of these beverages is alcohol, an odorless liquid, which mixes freely with water under all conditions. Its effect upon the human organism, when taken moderately, is stimulating—the action of the heart is increased and the nervous system becomes animated. Taken in large quantities it causes stupor and prostration, and even sudden death. Alcohol, besides, works upon the gastric juices of the stomach and appeases the feeling of hunger. An undesirable ingredient accompanying many alcoholic liquors is fusel oil. Fusel oil has a penetrating, offensive odor. Its presence in liquor can be discovered by rubbing some of the liquor between the two hands, when the odor will be noticeable. The fusel oil of potatoes is more dangerous to health than that of rye. Fusel oil is the principal agent to cause a detrimental effect upon health by a misuse of alcoholic drinks, although excess in the use of alcoholic drink will, also for other reasons, injure health. The misuse of alcohol, and inebriation, will be given further attention in another chapter.

Some of the best known alcoholic drinks are:

(1) Liquors. They are produced from the starch of rye, barley, potatoes, etc., by transforming it by mashing into fermentable sugar. Through fermentation there are developed alcohol, carbonic acid, glycerine, and small quantities of other organic acids. By a distilling of this fermented matter the alcohol is secured, which, through the mixing with water, is made into the drinkable liquor. Of alcoholic drinks it is principally liquor which contains fusel oil. To prevent danger to health, this ingredient must not amount to more than 1-10%. Rum is manufac-

tured from sugar sirups, brandy by distilling of grape wines, arrack from malted and fermented rice. It may be mentioned that these three kinds of liquors are generally sold in an adulterated state, and are but seldom genuine.

(2) Beers and ales are obtained by a yeast fermentation, without distillation, of a mixture of malt, hops, and water. They contain relatively little alcohol. A considerable amount of hop resin contained in new beer may cause a violent and painful irritation of the bladder. Good beer is wholesome and nutritious, owing to its contents of hydrates of carbon and salts. Taken in small quantities it may prove of benefit to convalescents and individuals of poor condition of the blood, owing to its stimulating effect upon the appetite. It retards digestion if taken in large quantities. Persons inclined to obesity should take beer very sparingly or better avoid it altogether. In moderate quantities it is of benefit also to nervous persons. It calms their nerves and induces sleep.

(3) Wine. Ripe grapes are crushed, and the juice so obtained is kept for some days, with the skin and seed-kernels left in the same, so as to thoroughly absorb the substances which give wine its peculiar flavor. White wine is then pressed out of this mass, while red wine is not pressed until after fermentation, as only the acids of fermentation will extract color from the grapes. Good wine is of great benefit if taken moderately. To aged people, in whom the functional energy is weakened, wine is of great consequence.

Of course, an excessive consumption of wine can not help but be injurious. Chronic alcoholism is found with the habitual drinker of wine as well as with the drinker of strong liquor. Gout is generally the result of the continued drinking of heavy wines.

Children should not take alcoholic drinks of any kind, unless prescribed in case of sickness.

Other stimulating beverages, gratifying to the taste, are coffee, tea, and chocolate. The drink we call coffee is an infusion of the seeds of the coffee tree. Before being put to use, the coffee beans are roasted. By this process the wooden fiber is carbonated and the aroma is developed. The action of coffee upon the nervous system is stimulating—it produces energetic action of the heart and kindles the mental and physical powers. Coffee is adulterated in many ways. The meal of wheat and Indian corn are used to produce artificial coffee beans, which are so like the genuine bean that only a microscopic or chemical analysis can tell the difference.

A simpler method, however, of detecting adulteration is the following: If put in ether, the artificial bean will at once sink to the bottom, while the genuine bean, on account of its fatty substance, will float for some time.

Roasted and ground coffee offers a great opportunity for adulteration. Ground coffee especially is largely adulterated with shavings of iron, with sand, clay, etc.

Tea is the infusion of the leaves of the tea shrub after they have been prepared by heating, roasting, or slight fermentation. Tea is adulterated by the admixture of leaves of various kinds.

From the fruit of the cocoa tree there is obtained cocoa, which, with an admixture of sugar and spices, is made into chocolate.

Cocoa differs from tea and coffee in that respect that, if properly prepared, it furnishes a very nourishing beverage. The nourishing ingredients of cocoa are dissolved if the powdered cocoa, mixed with eight parts of milk, is boiled for ten minutes under constant stirring.

Ingredients used in the preparation of food either to

give taste or to aid digestion are called spices or condiments. Their importance is found in their effect upon the digestive channels in exciting an increased secretion of the gastric juices. Such spices are cloves, black pepper, red pepper, mustard, horseradish.

The most indispensable spice for foods is table salt. It plays a very important part in the household of the body. The great natural craving for it sufficiently indicates its importance.

We must not conclude this chapter without mentioning the use of tobacco, which first was found in use among the natives of America. It was from there taken to Europe. Since that time the use of tobacco has been constantly growing, although ecclesiastical as well as worldly authorities have at various times endeavored to suppress or at least restrict the use of it. At the present time the world's consumption of tobacco amounts to from six to seven hundred million pounds.

The most prominent ingredient of the tobacco plant is nicotine, a narcotic poison. Nicotine is a powerful nerve stimulant, which, if used in excess, will cause palsy or paralysis. Tobacco is used in three different ways.

The use least detrimental to health is to snuff it. According to a medical authority 500 grains of this form of tobacco contain only 0.062% of nicotine. The snuffing of tobacco is, therefore, not so detrimental to health as the use of it in other forms, although in the form of snuff fraudulent admixtures to it would be more difficult to detect. When packed in tinfoil, it has often been the cause of lead poisoning.

The chewing of tobacco is largely in favor with persons who have outdoor employment, such as soldiers, sailors, men employed in the building trades, etc.

The sanitary influence of chewing tobacco has, like the

use of any kind of stimulant, been judged in various ways. Anybody who has had occasion to examine a large number of tobacco chewing men will have to acknowledge that, as a general rule, they are healthy individuals, possessed especially of healthy, strong teeth. At any rate, the use of tobacco in this form does not seem to have detrimental effects.

The smoking of tobacco is the most common form of using it. The smoking of cigars is more liable to be detrimental to health than the smoking of pipes, because in the latter the smoke has to pass through a certain distance before it reaches the mouth, thus losing some of its irritating qualities.

The effects of the smoking of tobacco upon the human body are local as well as general.

If done to excess, it will cause a chronic catarrh of the membrane of the throat and secretion of a mucous phlegm, causing irritation; the tongue becomes coated and the sense of taste dulled. The eyes become inflamed by the smoke. The irritation of the delicate skin of the lips, caused by the continual carrying in the mouth of a short pipe, should also be considered. Cancer of the lips is sometimes the consequence.

It is stated by medical authority that a moderate use of tobacco increases the activity of the brain and combats the inclination for sleep; it has a soothing, but not an exhilarating, influence. It always causes a slight weakening of the muscles. The secretion of saliva is increased by smoking tobacco, which thereby becomes an aid to digestion; it also stimulates the action of the bowels and the secretion of urine.

Smoking is to be avoided in all forms of chronic catarrh of the various membranes, even in catarrh of the bladder. In suppuration of the ear it is particularly harmful. It

should also be avoided in cases of sleeplessness produced by mental exertion, in weakness of the heart, and neuralgic afflictions.

Any one of the three ways of consuming tobacco becomes detrimental to health if used to excess. Proper consideration of fellow beings, moreover, should make us careful not to offend decency by tobacco use. Chewing of tobacco especially is distasteful and insufferable among people of refinement.

IV.—Dwelling and Clothing

Our climate, our morals, our habits of living, our occupations, and incidents of our daily life cause us to spend only a comparatively small part of our time in the open air. Most human beings spend the greater part of their time in closed rooms, either at home, or according to their calling, in schools, churches, hospitals, manufacturing plants, or offices.

It is, therefore, apparent that the dwelling must have an important influence upon the condition of human health, because detrimental influences in this connection are liable to be of lasting effect. From a hygienic point of view we are interested in dwelling in three different ways: 1. The location; 2. The soil upon which the dwelling is erected; 3. The material used in its construction.

The location is the healthier the more free access atmospheric air and sunlight have to all parts of the dwelling. If houses are built too closely together, if the courtyards or airshafts are reduced to the smallest space, the air in the living rooms of such buildings will be seriously impaired. Consequently, in large cities, squares and open places, particularly if planted with trees and shrubbery, are of great hygienic value. Dwellings are made un-

healthy by improperly constructed drains, sewers, or by the proximate location of latrines and dunghills.

This topic will be treated more fully in another chapter of this work.

Of great influence upon health are the surroundings of dwellings in industrial centres. Through injurious gases, smoke from factory chimneys, continuous loud noises, manufacturing districts become unsuitable for dwelling.

The soil upon which a house is erected may be considered healthy if it is dry sand or rock, and if it does not contain decaying matter or stagnant water. The building materials generally used are wood and brick. The mortar used in stone buildings contains a large part of water, so that, in the just finished building, there is contained a considerable quantity of water. In the foundation and walls of a newly erected ordinary brick dwelling there are contained many thousand quarts of water, which will evaporate. From a sanitary point of view it is, therefore, advisable that newly erected brick buildings should not be occupied until thoroughly dried.

Damp walls, such as in new buildings, are of a twofold consequence in regard to health. In the first instance, there is no air circulation, because air can not penetrate the pores of the bricks if filled with water. Furthermore, damp walls absorb heat in a much greater degree than dry walls. Dwellers in houses with damp walls lose a great amount of bodily heat by a one-sided radiation. Hence the uncomfortable, chilly feeling that one experiences in such houses. Further consequences of a protracted stay in damp rooms are rheumatism, catarrh of the respiratory organs, kidney trouble, with resulting dropsy. Dampness in dwellings may also be due to the soil upon which they are erected. We have said above that the ground should be dry. But it is natural that this

precaution can not always be observed. Therefore, in order to prevent the ascending of dampness through the pores of the bricks, etc., it is advisable to cover the cellar floor with an impenetrable layer of cement.

If water from rains or floods has flowed into the cellars or basements of dwelling houses, it should be pumped out as soon as possible, because such water is sure to be impure and to contain a great deal of decaying matter. After the water has been removed as thoroughly as possible, the remaining moisture should be disinfected by an application of a mixture of carbolic acid and water, or of chloride of lime and water.

Walls are treated with the disinfectant by brushes or mops; floors are cleaned by scrubbing with it.

Public institutions, such as schools, orphan asylums, prisons, and hospitals, should be most carefully attended to in the described manner when they have suffered an inundation.

We will now take under consideration those parts of a dwelling which are in constant use as living rooms.

Rooms with southern exposure are preferable to those of northern exposure, because they offer a free access to sunlight. They are drier, more cheerful, warmer in the cold season, and benefited by the southern breezes in summer time.

Special consideration is due to the sanitary conditions of the modern flat and apartment houses in large cities. According to the late Professor Virchow and other authorities, living-rooms situated on the fourth or fifth story are more detrimental to the health of their inhabitants than even the rooms in the basement. To mention only one fact, it has been ascertained that the greatest percentage of miscarriages happen among women living on the upper floors.

Care should be taken, whenever possible, to have separate rooms for the members of a family, because the air of overcrowded rooms soon becomes vitiated by the process of respiration. The overcrowding of living rooms does not only take place in large cities, but also happens frequently in the country, especially in winter time.

It is an accepted fact that, per person and hour, thirteen cubic feet of fresh air are necessary. The air of the atmosphere gains access through the cracks of windows and doors, and also through the pores of walls, especially at a time when dwellings are heated. Under any circumstances this access of air has largely to be assisted by the opening of windows.

It has been found lately that the filling between ceiling and flooring is frequently injurious to health. It is apparent that the slightest defect in the flooring is sufficient to allow the space under floors to become, in the course of years, an accumulation of dirt and decaying matter which is bound to breed sickness. This is essentially the case in rooms that are used as sick rooms. There is, therefore, also great danger from this source in new buildings constructed of old building material. By microscopic examination it has been found that old material used for filling in between floor and ceiling contained germs of consumption, typhus, and membranous croup. The safest material for this purpose is sand or ashes.

To make our living-rooms comfortable we require lighting and heating, both of which are of the greatest importance for our health.

Great progress has been made in the manner of lighting. Starting from the old fashioned candle or oil lamp, there has come into use, at first kerosene oil, then gas, and now electric light. Let us now inquire into the sanitary conditions of the various modern ways of illuminating.

Kerosene is found in the bowels of the earth, deposited there by a decomposition of vegetable and animal matter.

The raw kerosene, or petroleum, is made available for use by distillation. Properly distilled kerosene will not develop a dangerous amount of explosive gases, even if exposed to a high degree of heat.

One of the most widely used materials for lighting purposes is illuminating gas, usually obtained from coal.

Illuminating gas obtained from coal requires a complicated process of purification to remove obnoxious and noncombustible matter. The most important element of illuminating gas as regards human health is carbonic acid gas, because it is well known as a deadly poison if inhaled in considerable quantity. By the process of burning it is changed completely into carbonic acid. If illuminating gas saturates the air to the extent of from 10-25% the mixture then becomes highly explosive. Accidents due to such explosions are quite frequent.

In our times electric light is largely taking the place of illuminating gas. There are two kinds of electric light, the arc light and the incandescent light.

The first is produced by two pieces of carbon, which represent the positive and negative pole of a current and consist of a stream of glowing particles of carbon.

The incandescent light is formed by heating a thin carbon wire in a vacuous glass bulb until it glows.

In regard to health we have to consider in this connection principally the eyes, which are greatly affected by artificial light. The principal requirement is that the light should be steady and not flickering. Lamp shades are of great importance in the universally accepted mode of lighting. They prevent the rays of the light from falling directly into the eyes, from causing a strong dazzling and preventing the eyes from distinguishing objects. Such

shades also reflect and concentrate the light upon the working table. The evenness of the flame is of importance, for the reason that a flickering or wavering light is very injurious to the eyes.

All illuminating materials, excepting the incandescent light, contaminate the air of living-rooms by the process of burning. Besides, they create a considerable amount of heat. A burning kerosene lamp emits about twelve times the amount of carbonic acid which a human being does by respiration, and about eight times more of heat and vapor. Kerosene and gas are about equal in this respect.

By a comparison of gas and electric light the conclusion is reached that both kinds of illumination have, from a hygienic standpoint, their advantages and disadvantages. In favor of electric light are the enhancing of the sense of color and the keenness of vision, the trifling production of heat, and the lack of corruption of the air; against it are its vivid dazzling qualities and the danger from the operation of a strong electric current. The disadvantages adduced against gas light are its great production of heat and corruption of the air, as well as the dangers of explosion, and of poisoning by inhalation.

The advantages of the electric light, from a sanitary point of view, according to this, are almost entirely lacking in gas.

In order to make living comfortable in dwelling places in our latitudes during the cold part of the year, heating arrangements are indispensable. The first object of every heating apparatus in dwellings is to keep the air always at a temperature agreeable and advantageous to the organism, i. e., of from 64 to 70 degrees Fahrenheit.

The quicker the heating results, the easier to regulate it, the less contamination of the air is caused by the

products of combustion, so much the more perfect are the heating arrangements, if they, furthermore, require little time for attendance and are as economical and cheap as possible. We distinguish between local and central heating arrangements.

In local heating arrangement the heat-dispenser is found in the rooms to be warmed. To this class belong the stove and the fireplace.

The construction of a stove is such that the fuel must either be continually put on, as in the ordinary stove, or emptied into it to serve for a longer time, as in the self-feeding stove.

Ordinary stoves allow of a quick warming of rooms, but require continual attention lest the fire should as quickly go out. The handling of the fuel gives rise to a troublesome development of dust and thereby to the deterioration of the air in the room, when a dust-producing substance like coal is used.

The common material of which stoves are made is iron. By great heat the thin sides of the stove easily become red hot, and in this condition permit the poisonous carbonic oxide gas to pass from the fire chamber to the room. To guard against this the sides of the stove are reinforced by the inserting of a fire pot in the fire chamber, which, however, does not prevent the side of the stove from becoming red hot.

Ordinary stoves provide, to a certain extent, for a renewing of the air of the room, because the air necessary for combustion is drawn from the room to be heated. There results a current of air from the room through the fire chamber to the chimney, and fresh air from the outside enters through the cracks of the doors and windows.

The self-feeding stove is supplied with fuel for a longer period. But this must be of a kind that will not cake,

so that spaces may be left through which the air necessary for combustion can pass.

By means of a regulating shutter in front of the stove, below the fire chamber, the entrance of air, and with it the intensity of the combustion, can be regulated at will.

The self-feeding stove permits of the easy regulation of uniform warmth to a room, as required by the temperature outside. On the other hand, it should not be overlooked that the more completely such stoves allow of shutting off the draft, the greater becomes the possibility of fire-damp (carbonic oxide) penetrating into the room. Many a perfect and patented self-feeding stove has had to be removed because of the appearance, among the occupants of a room, of illness resulting from chronic poisoning by carbonic oxide gas.

Carbonic oxide gas, which has already been mentioned as a poisonous ingredient of illuminating gas, is a colorless and *odorless* gas of a nature extremely poisonous for the human organism. It results from the incomplete combustion of carboniferous bodies, and especially from the process of combustion in a stove. This gas is also commonly called fire-damp. But this designation is not intended to apply to the smoke and vapor which arise from a fire. These last-mentioned products of combustion are intolerable to the senses and the breathing organs, and people, therefore, get rid of them as speedily as possible.

Carbonic oxide also emanates from glowing coals after the smoke has passed away. If at this stage of combustion the draft of the chimney is interrupted by means of a valve or shutter, the poisonous gas enters the room and is most deadly for the unwary occupants, especially in sleep. The gas is breathed by the lungs, and then enters into combination with the blood, so that the latter

can no longer absorb the oxygen, which is indispensable to life. Death follows painlessly.

If the quantity of gas breathed is not fatal, or the victim is resuscitated, there often remains behind a permanent impairment of health (mental debility, diabetes).

It is not stoves alone that in everyday life cause carbonic oxide poisoning, but also portable coal-burners, which sometimes through inexcusable carelessness are used to heat closed rooms. We have, in our practice, many times met with cases where servant girls, who had taken with them into their bedroom an iron pot filled with red hot anthracite and charcoal, were, on the following morning, found dead or dying.

In order to prevent injury to health, caution is also necessary in the use of apparatus for heating or cooking by gas. The gaseous products of combustion must be sufficiently diverted and fresh air must be allowed to enter, otherwise a considerable accumulation of dangerous carbonic oxide and a lessening of oxygen will result.

Heating by means of a fireplace is effected by the maintenance of an open fire in a niche in the wall, with a direct draft of the products of combustion into the chimney. Fireplaces are not very common in this country. In England and France they are much in use. However homelike a fireplace makes a room, it is not a practical method of heating, because a far too little part of the warmth produced by the fire is secured for the room. On the other hand, however, its great value as a ventilator for the room must be acknowledged.

As to central-heating apparatus, the heat producer is not in the room itself, but in another part of the house, commonly in the cellar, from which the distribution of warmth in the building is effected by means of a system

of pipes. Belonging to this class of apparatus are the heating by hot air, by steam, and by hot water.

A description of the construction of these apparatus would be too much of a digression here, but space may be given to a few remarks on their advantages and disadvantages, since it will be of interest for thoughtful people to be generally posted on these points. These heating arrangements are also ordinarily used in large establishments, like hospitals, orphan asylums, schools, convents, etc.

Heating by hot air can be installed cheaply, it combines rapidity of warming with a certain continuity. Its greatest advantage consists in assuring of a constant change of air in rooms, in which, as far as sanitation is concerned, it excels all other modes of heating.

The disadvantages of the hot air system are: Some difficulty of regulating the supply of warmth, great consumption of fuel, and the danger of leakage or overheating of the apparatus, and a consequent deterioration of the quality of the air.

Great care must be taken to restore to the heated air a sufficient degree of moisture, and this is accomplished by the placing of water within the heater, so that its steam mixes with the air distributed through the pipes.

Steam heating admits of wide distribution, and is, therefore largely in use in big buildings. It is easy to regulate.

Disadvantages of steam heat are: Costliness of installation, danger connected with the management of the boiler, the conductors easily become leaking and then cause an annoying noise. Special contrivances are necessary to secure moisture to the air, and also for the changing of air.

Steam heating can only exceptionally be specially in-

stalled in smaller dwellings; while for larger structures —for example, the heating of hospitals and institutions— steam heating will always have the preference.

Hot water heating works very rapidly, is simple to manage, and can be easily introduced at a moderate cost in buildings already existing.

Its disadvantages are the great rapidity with which it cools off, the danger of freezing, the singeing of the particles of dust that settle on the pipes, the dependence of the heating of different rooms on each other, and hence the difficulty already mentioned of obtaining the temperature wished for; lack of change of air.

This method of heating is not to be recommended for dwelling houses, but, on the other hand, it is good for heating single subordinate parts—for example, enclosed staircases and corridors—as well as for single large rooms that have to be used daily, such as halls of all kinds and restaurants.

VENTILATION.—Regarding this subject, it has already been many times mentioned that change of air is necessary for the maintenance of good health, while living in closed rooms. Fresh air must be introduced and the air already used must be expelled. This renewing of the air in closed rooms we call ventilation.

In dwelling rooms the natural circulation of air through doors and windows usually suffices. In warm weather the windows are frequently open, and during the season of heating, the cooler, fresh air penetrates through the cracks of doors and windows, while the used-up, warmer, and therefore lighter, air is carried off through cracks of the upper parts of windows or through opened transoms. Air also escapes through the stove.

In larger rooms, however, where many people are gathered, the natural circulation is often not sufficient for

a renovation of the air. In these cases the heating apparatus is combined with a ventilating arrangement, or special ventilating shafts are installed, or other mechanical contrivances are resorted to. The latter are usually circular fans, placed in windows, and set in rapid revolution. They are so constructed that one captures fresh air for the room to be ventilated, while another expels the used-up air in another place (ventilation by means of aspiration and expulsion).

Privies.—A discussion of hygienic requirements for a perfect dwelling can not be dismissed without touching upon the removal of human excrement.

Every properly erected house ought to have a convenient and well-arranged privy. An inappropriate or faultily constructed privy renders the finest residence uncomfortable and dangerous to health.

The privy, where there are no sewers, ought to be situated on the side of the house, where wind and sun have access. The room itself ought to be sufficiently spacious. The floor, walls, and ceiling must be smooth and easy to clean. There should be no living-room above it. The opening of the hole in the seat must be closed with a lid. The better installations are those that have in the opening a funnel-shaped trap of enameled iron, closed underneath by a movable valve. The cleansing of the trap is accomplished by an arrangement of running water.

The excremental matter falls into a cavity or a removable receptacle (barrel, etc.). This cavity must be made watertight on the bottom and sides. For greater safety it is recommended that a layer of rich clay be pressed hard around the sides, on the bottom of the pit, and also its enclosing walls, in order that the surrounding soil may not become infected. The conduit to the pit

must be on the outside of the building, well closed, and should receive an additional cover of earth. In order to ventilate the cavity, or cistern, for the purpose of averting an accumulation of ill-smelling gases and their entrance into the dwelling, it is recommended that an air-drain be arranged by leading a pipe from the cistern to a point above the top of the house, or at least above the highest windows. This pipe, however, only accomplishes its object if the air in it is warmed, and so is kept circulating. Therefore, this drain pipe is placed, where possible, near a chimney.

In order to keep a privy odorless, it is flushed with water, where running water is available, or from time to time dry earth is thrown into the pit.

The cisterns, as well as removable receptacles, require to be emptied and cleaned from time to time. The use of chlorides is recommended to dispel gases and destroy germs.

In large cities the refuse of the privies is removed by sewers.

The drainage of cities consists of a subterranean network of pipes, connecting with the water closets and sinks of the houses, discharging their contents into larger pipes and sewers, and, by means of a natural descent, into a great central reservoir or into some large river near by. If there is no suitable large stream at hand, the sewage is removed by pumps and used for agricultural purposes. Sometimes it is destroyed by cremation.

Drainage and running water secured by aqueducts are hygienic arrangements of large cities that go hand in hand.

Clothing.

In considering clothing from a hygienic standpoint, its first object is the regulation of the warmth of the body. To accomplish this in our climate we need a considerable amount of clothing.

The materials of our clothing are woven either out of vegetable fiber (cotton, linen), or out of the hair of animals (wool), or out of silk thread. They are, therefore, porous, with interstices between the individual fibers. The air contained in these pores and between the garments plays an important role, the effect of the clothing being the hindering of the escape of warmth generated by the body.

The prevention of the escape of warmth from the body becomes essentially lessened if the clothes are wet. Wet clothes, in which the air in the pores of the material is dislodged by water, conduct warmth much more readily than dry clothes containing air in their pores. Furthermore, the evaporation of the water in the clothes produces cold, very perceptible to the skin.

For the maintenance of bodily well-being, however, the warming effect of clothing is not alone decisive. There must also be a circulation of air, from the surface of the body through the clothing. Unobstructed exhalation of the body is quite as important for the health as the free breathing through the lungs. In this regard, therefore, earnest consideration must be given to the porosity of clothing. An obvious example is rubber clothing. While retaining a great deal of heat, it is quite unsuitable, because circulation of air is not permitted.

A third task of clothing is the protection of the surface of the body against the direct rays of heat, whether

caused, in the open air, by the sun, or by artificial sources of heat.

Light colored, white or yellow, goods afford the best protection against the sun's rays. If the absorbing power of heat by white material be placed at 100: that of light yellow will be 102; of dark yellow, 140; of light green, 152; of red, 168; of light blue, 168; of black, 208. Thus the clergyman with his black clothes is, in this respect, most unfavorably situated, a misfortune which can be somewhat compensated by lightness of material.

Different parts of the body demand special consideration in respect to clothing.

So the head, as was mentioned above in our remarks on sunstroke, must be protected by an airy and light covering against the rays of the sun. The wearing of heavy head covering, which permits no ventilation to the skin of the head, causes dizziness, perspiration of the head and consequent wetting of the hair, injures the growth of the latter and causes it to fall out.

The neck, on account of its important blood vessels and nerves, must be free from tight-fitting clothing. Otherwise there will result congestion of the blood, rush of blood to the head, causing headache and injury to the eyes. People should be especially warned against the use of thick shawls. They effeminate the neck and render the organs situated in this part (tonsils, upper part of the throat, larynx) unable to resist the influence of weather.

The lower part of the body, in times of epidemic illnesses of the digestive organs (intestinal catarrh, diarrhea, cholera), should be protected by a body band.

The clothing of the feet requires particular care. Wet stockings, for instance, for the reasons already mentioned, cause colds. Furthermore, the style of the leather foot-covering must be one fitting the structure of the foot.

Tight shoes are not only a torment for the wearer, but they also hinder the natural growth and the circulation of blood of the foot, and may cause very painful and annoying corns and ulcers.

Besides interrupting the regulation of warmth, when in a wet condition, clothes can also cause illness in other ways.

It is especially harmful to wear too many layers of clothes. When a man wears four or five different clothes, one over the other, there can hardly be said to be a normal skin exhalation.

Colored garments, for instance, stockings and underclothes, can give rise to skin diseases when the coloring matter is poisonous (aniline dyes, colors made of lead).

Particular danger lurks in second-hand clothes, such as bought from old clothes dealers. Many diseases, consumption among others, can be spread by the wearing of second-hand clothes. Where the use of such clothing must be resorted to, as in asylums for the poor, etc., it should be worn only after a thorough disinfection in a steam disinfection apparatus.

In connection with a discussion of the hygienic purpose of clothing, the care of the surface of the body—the skin —must receive attention.

Warm baths open the pores of the skin, by expelling dirt that gathers in them through the mixing of perspiration with small particles shed by the skin and minute fibers from the underclothing. Only then can an evaporation through the skin—or the breathing through the skin, as physiologists say—take place in a normal manner. The importance of this operation for the maintenance of a healthy body has been shown. Washing with cold water, and cold baths, stimulate and harden the skin, so that the body becomes able to resist without injury the inclemency of weather.

A special obligation, also of particular importance to clergymen, is the care of the teeth.

The importance of good teeth for public speaking is known; everybody who has to use his organ of speech in public is aware of this, and, above all, the one who has defective teeth. Besides, good teeth are needful for a normal digestion—all of which is sufficient reason for taking particular care of the teeth, without considering the esthetic side of the question.

The chief enemy of the teeth is a fungous growth which is developed between them by spittle mixing with remains of food. It corrodes the enamel of the teeth, and gradually the substance of the teeth is destroyed. To prevent this, a regular cleansing of the teeth with a good tooth brush is necessary. As a tooth powder, one made out of carbonate of lime and an evanescent oil (as the oil of peppermint) may be recommended. The cleansing of the teeth takes place most advantageously before going to bed, because decomposition in the uncleansed cavities of the mouth sets in most easily during the night. The tooth brush should be used not alone in a horizontal direction, but also vertically, so that the interstices between the teeth may be cleaned. In order to remove the tartar that gathers on teeth and the dark color that the teeth of many smokers acquire, a cleansing of the teeth by a skilled dentist, from time to time, is recommended.

V.—Hygiene of Schools.

Owing to the close connections that exist between the clergyman and the school, it is evident that the former must be desirous to know of the perils to health that the schools may bring.—*Mens sana in corpore sano.*

The influence exerted on the child by the school will

have its effect, also in relation to his body, not seldom lasting all through life. At no period of life can external pernicious influences result in greater harm than at the time when man, though most capable of training, is still undeveloped in his organism and of little force of resistance. It can not be denied that the perils to health of the school are often exaggerated by parents and physicians. On the other hand, unprejudiced observation shows that many forms of illness occur exclusively among children of school age, for the origin of which the school itself must be held responsible. We may, therefore, speak very well of school diseases. These diseases are contracted partly through the stay in school rooms, partly through the deportment of the body during tuition.

Here belong congestion of the head, headache in forehead and back part of the head, nose-bleeding, pulmonary diseases, indigestion, liver complaints, curvatures of the spine (*scoliosis*), the latter especially frequent among girls. Ordinary *scoliosis*—lateral bending of the spine: one shoulder becoming consequently higher than the other—Professor Virchow characterizes directly as an arrest in development of the body due to the school. The spread of contagious diseases through the school should also not be overlooked.

Hygiene of the school concerns itself, first of all, with the school building.

The schoolhouse, like the dwelling house, must be erected on healthy soil. It should have an open space all around and be situated as quietly as possible. The structure must be solid, the material without defect, and the new structure sufficiently dry before occupation. The corridors must be light and well ventilated. The stairs must not be steep or winding (no spiral staircases) and must be provided with guard railings.

In the installation of the water closets the general sanitary requirements mentioned in the case of dwelling houses are to be observed. In the privies a seat should be provided for each twenty-five to thirty children. Seats should be suitable, not too high nor too low. They should be separated by solid board partitions. The cleanliness of privies and urinals should be severely insisted upon.

As an indispensable requisite, every schoolhouse must have a playground. To every two hundred children there should be a quarter of an acre.

Furthermore, the attention of those concerned in hygiene is directed to the schoolroom and its disposition.

The first and most important condition for a good schoolroom is its adequate size, which alone makes possible the preservation of good air. There may be no fault to be found with all other arrangements, yet when the requisite size of the room is lacking, all other precautions are in vain and the health of the scholars and teachers will unavoidably be undermined.

Not more than eighty scholars should be taught in one class. The suitable ratio of length to breadth of a schoolroom is considered to be 3 to 2. For classes with less than fifty scholars a space approaching square size is allowable. The length of the room ought not to be more than thirty yards, its width not more than twenty yards. A clear height of less than ten yards or of more than fourteen yards for the schoolroom is to be avoided.

The flooring of the ground floor, where there is no cellar, must be at least a foot and a half above the ground. Underneath should be placed a layer of dry sand, or sifted coal ashes, eight inches thick. The floor should be of oak planks, closely joined, and resting upon supporting beams laid near together.

Walls and ceiling must be trimmed smooth. The

former should be painted in a light blue, or grayish blue, shade; the latter may be calcimined. Wall papers should not be tolerated in school buildings.

The doors of the schoolroom must be at least forty inches wide, must be in plain sight of the children (not on a back wall) and must open outward.

The light should always fall on the children from the left side; the windows, therefore, must be placed as suitably as possible for this purpose in one of the side walls. The wall back of the teacher's chair, the opposite side wall, and the wall back of the children, should have no windows. The ratio of size of the surface of glass in the windows, to the surface of the floor in the room should be 1 to 5 or 1 to 6. Direct sunlight must be kept off by means of shades of unbleached linen or something similar.

These requirements regarding the light are of decisive importance for the prevention of short-sightedness. A renowned oculist found in the schools of a city, where they were situated in *wide* streets, 1.8 to 6.6% of the children afflicted with short sight; in other schools, shut in by high buildings and in narrow streets, the proportion was as large as 7.4 to 15.1%.

In providing school benches care should be taken that they afford to each scholar a seat in accordance with requirements of health. As a rule, a stable connection of desk and bench, affording each scholar a width of seat of about two feet, is recommended. In each class there are likely to be scholars of generous build, requiring corresponding styles of seats, and for all classes the availability of four different sizes of benches is recommended.

Besides these stable school benches, there are constructed such with independent desks or with seats to fold up, etc.

The position of the pupils on their benches, for writ-

ing or reading, is of great importance for the preventing of bending of the spine.

In the ordinary faulty position of pupils the right shoulder is raised and pushed forward; the left hand rests on the edge of the desk; the left arm is drawn back; the left shoulder and head are inclined toward the left side; the vertebrae are turned about their axis toward the right. As a result, the head rests no longer on the spinal column, but, hanging forward and to the right, it is at first supported by exertion of the muscles of the neck; then, when these become tired, it supports itself by leaning against the chest, which latter will rest on the edge of the desk. Thus the eyes are brought within only a few inches of the writing. That such a position must injure the spine, and likewise the eyes, goes without saying. In an examination of the children of a certain school it was found that, out of one hundred and sixty-two girls examined, only ninety-two were entirely erect; while in fifty-four there were found the first stages of curvature of the spine. In other children the trouble was found to have already progressed further, and several of them proved to be incurable.

The important progress of general hygiene, which has introduced reforms relative to all our functions of life, and in particular regarding the care of the body, directs attention to all those circumstances of school life from which proceed influences upon the health of pupils, and it is to be hailed as a gratifying result that the care of the health of school children now finds active attention in ever-widening circles.

Of course, many a desirable improvement must, for the present, be dispensed with on account of some insurmountable difficulty, which, however, makes it an only more pressing duty to painfully and conscientiously take all

such measures which circumstances may allow to be carried out.

Another important factor in the care of health in schools, important also from an educational point of view, is *cleanliness.* Especially injurious is the dust in schoolrooms. It spreads the bacilli and causes the infection of diseases of the eye, as proven by medical authorities. The schoolroom, with its furniture, must, therefore, be dusted often and thoroughly. For this purpose it is not sufficient to sweep the schoolrooms twice weekly with a dry broom, but they must be cleaned each week at least once with a wet mop. The dust every time must be carefully removed with a moist rag. Moreover, where there is room enough it should be arranged that wet overshoes and coats are discarded before entering the schoolroom.

Finally, it may be pointed out that out of regard for the eyesight of the pupils slates should be used as little as possible. In the absence of a better and more practical medium, they can not be entirely dispensed with. Their use, however, in schools with more classes than one, should in future be confined to the first two years. In one-class and half-day schools, frequented primarily by children of the poorer country population, it may, of course, not be possible to restrict the use of the slates in a like manner.

When heating the schoolrooms during the cold spell by means of stoves a pail of water should be placed on each stove to keep the air moist. The stoves ought to be in good condition and provided with a fire pot.

Protection Against Contagion.

Furthermore, the school plays an important part in the spreading of contagious diseases prevalent with children, especially measles and scarlet fever.

Under the following points we gather some information as to how to protect as far as possible the children against contagion:

1. Diseases which, since easily contracted, render necessary special rules for schools include:

(*a*) Cholera, dysentery, measles, rubeola, scarlet fever, diphtheria, smallpox, spilosis, and relapsing fever.

(*b*) Abdominal typhus, contagious inflammation of the eye, scabies, and whooping cough if acute and accompanied by spasm.

2. Children stricken with one of the diseases enumerated under (*a*) or (*b*) are to be excluded from frequenting the school.

3. The same applies to children in whose homes one of the sicknesses in 1 under (*a*), mentioned, occurs, even if the children themselves be in perfect health. An exception may only be granted upon a physician's testimony, that the child by reason of thorough isolation is rendered safe from infection.

4. Children excluded from school for reasons set forth in 2 or 3 may only be readmitted upon a physician's attest that all danger of infection has passed away, or after the lapse of such certain time, which by experience is considered as the normal duration of the sickness.

5. The normal duration of smallpox and scarlet fever is six weeks; for measles and rubeola, four weeks.

The child, and his clothes, should be thoroughly cleansed before he is readmitted.

For the enforcing of the rules 2-4 the head of the school (principal, first teacher, director, or rector) is responsible.

6. In boarding-school, seminaries, and the like, if there occurs a case of contagious disease, inmates may, during its course or immediately thereafter, be allowed to go home, provided this may be done, according to the opinion of a physician, without danger of infection, and all necessary measures of precaution, as laid down by physicians, must be complied with. Under the same conditions, children may be discharged on demand by their parents, guardians, or foster-parents.

7. If a person dwelling in the schoolhouse be stricken with one of the diseases named under (*a*) and (*b*), or if a person living in the same house with one of the schoolteachers be stricken with one of the diseases as named in 1 (*a*), the head of the family must immediately inform the school board. The patient must be placed in quarantine. The civil authorities are to decide whether or not the school is to be closed, and what sanitary measures should be taken. This rule applies also to boarding schools.

8. If several cases, as in 1, appear in the locality of the school or its environs, principal and teachers have to pay particular attention that the schoolhouse is kept clean and that the rooms are well ventilated. Especially the classrooms and the toilets must be thoroughly cleaned every day, which work must not be performed by school children.

The classrooms must be constantly ventilated, also after school hours; and the closets must be regularly disinfected.

9. The closing of schools or single classes is decided upon by the civil authorities in consultation with the of-

ficial physician. In case of imminent danger, the school board and the local police have the power to close on the strength of any physician's opinion.

10. The reopening of a school or class, closed on account of a contagious disease, must be preceded by a thorough cleaning and disinfecting of the schoolrooms. The reopening can only be ordered by the civil authority, the official physician concurring.

VI.—The Infirmary.

Another public institution which offers a field for the clergyman is the hospital. As pointed out in the preface, hospitals and hospices were founded in the first Christian centuries by the Church.

General epidemics (pestilence, black death, pox, leprosy) led to the erection of numerous plague-houses. The Church at all times, through its servants, has maintained and supported such institutions wherever she was able.

Even to-day there are many places where the clergyman is a member of the board of managers of an infirmary, and it behooves him to know the principal sanitary requirements.

It goes without saying that a building, wherein patients are to regain their health, must stand on dry, clean soil and be provided with good drinking-water. It ought to be situated in an open and quiet neighborhood. In manufacturing towns the vicinity of factories and shops ought to be avoided. The dimensions of the site depend on the number of patients for whom the hospital is destined.

If possible, the estimate should include the laying out of a garden. Wherever possible hospital and ground space should allow two hundred square yards, or at least one hundred square yards, for each patient.

To each bedstead is to be allotted a space of eight to ten square yards, an air space of thirty to sixty cubic yards, and a light space (in windows) of one and a half to two and a half square yards. Length, width, and height of rooms, also the number of windows, may be calculated from the foregoing dimensions.

For the supply of direct sunshine, which every sick man greatly needs, is of importance not only the number and the size of the windows, but also their location. They must be placed so advantageously that they are reached by the sun through the greater part of the day and the most part of the year. They are to be provided with blinds.

All rooms in the hospitals, especially the sick-rooms, ought to be well provided with good fresh air, which can be achieved by ventilation and good mechanical cleansing. Should the natural ventilation prove insufficient to replenish the air, then air pumps are to be used. Of material importance is the prompt removal of excretion and sputum, and the sweeping away of the dust with a moist mop or rag.

In preserving good air the mode of heating and lighting plays no small part. Steam heat is preferable to the ordinary stove, and the electric light to gas or kerosene, for the latter consume oxygen and produce carbonic acid.

In order to meet all exigencies for a hospital, the builder of a hospital has the choice of three systems: the corridor, the pavilion, and the barrack systems.

The corridor system, representing the uniform hospital, is especially adapted for small infirmaries with from ten to one hundred beds. The sick-rooms are all adjacent, and have only one window-wall; the doors open into the corridor, which ought to be lighted by numerous windows.

Apart from the main building, and only connected with it by a passageway leading from the ground floor, is the building containing kitchen, laundry, etc. Only in this way can the patients be spared the vapor and odor from these places.

As far apart as possible from the other sick-rooms, are the rooms for delirious and insane patients; also an isolated room for contagious diseases, if a special building for such diseases can not be obtained.

Every hospital should have a morgue, for the dead bodies should, for various reasons, not be kept within the institution itself. In the morgue building may be located the disinfecting room—likewise indispensable for every hospital. There the disinfecting apparatus, worked by steam, may be placed.

In contrast with the corridor system, which assembles all patients in one building, are the barrack and the pavilion systems, which scatter them.

The barrack contains a large sick room, room for the nurses, isolating rooms, the scullery, baths, and water-closets. The beds, as a rule, are placed in two rows, separated by a spacious passageway. The ceiling is formed by slanting roofing, the ridge of which is raised and provided with window-blinds, which let the bad air escape and admit fresh air.

The plan of sick room and outbuilding is the same in the pavilion system as in the barrack. In the former system, however, there is no ridge ventilation, and there must be special ventilating appliances. On the other hand, it admits of the erection of two or three story buildings. In larger institutions these sick rooms—barracks or pavilions—are linked to a central building containing the offices, kitchen, laundry, etc.

VII.—Death. Asphyxy. Signs of Death. Manners of Death. Burial.

When all the organs of the human body have definitely ceased to work, then death has set in.

The transition from life to death may be sudden, even in people of good health; for instance, in case of death by lightning, by sunstroke or apoplexy, by crushing or laceration, by bullet wounds, during childbirth or confinement, while undergoing difficult operation, in some cases of poisoning, or through grave interior hemorrhages, of the brain for instance, or of the lungs. In such cases of death pose and facial expression of the dead remain exactly as they were in his last moments; whereof every battlefield furnishes proof, likewise the inquest over suicides. Generally, however, death comes more or less gradually, and is heralded by preceding signs. The stage in which these signs occur is called death-struggle or agony.

The last phase of life of a person has been called a struggle, because it often shows symptoms of excitement, particularly of pains and spasms, and because it was taken to be the last stand of the principle of life against the threatening annihilation. On the other hand, many people, especially those of advanced age, pass away very quietly and without pain. The strength of the body has nothing to do with the agony. The strongest apoplectic may die without struggle, while the most emaciated consumptive suffers for hours and days, so that the ancients said of these afflicted, " Non moriuntur, sed extinguuntur sicuti elychnium deficiente oleo."

The agony in all cases presents a mixture of the symptoms of the death-causing malady and of the signs

of the progressing paralysis of the nerves and muscles. The different organs of the body die off in a certain almost regular order.

Consciousness, if present in agony, survives the senses. It seems as if scent and taste disappear first. Then vanishes the sight. Dying people complain frequently of a fog in front of their eyes, or cry for light. Their hearing, however, is responsive to impressions even after the eye is already surrounded by darkness. The attention of the bystander should be called to this fact, lest any incautious remarks be made. The faculty of feeling remains sometimes to the last moment. The dying feel the cold, which gradually extends from the periphery of the body to the inner parts.

The exterior muscles are the ones to first lose the faculty to obey the will. The sinews contract, but are unable to move the limbs. The body slides downward in the bed; the limbs, obeying the law of gravitation, fall down powerless if raised. The features begin to appear drawn, the underjaw drops, the eyelids sink, but do not close. In prolonged agony, the coat of the eye becomes red. The patient is unable to fix the eye upon an object; the cornea loses its luster and becomes dull. The temples shrink. The nose becomes pointed and seems elongated. The nostrils are caved in. The whole face seems longer. The outlines of the jawbones stand out sharply, owing to the relaxed muscles. The chin is pointed and protruding. The lips are dry, the complexion yellowish or bluish; the skin is cool, covered with cold, sticky perspiration. The picture sketched is called *facies Hippocratica.*

Breathing is slow, with long intervals and difficult. The respiration is uneven. After some superficial drafts, the patient breathes deeply. The tracheas are filled with phlegm, which no longer can be expectorated by coughing.

The air, breathed in and out, produces in the phlegm of the bronchia a rattling sound, that can be heard at a distance—the death-rattle. The contraction of the heart becomes weaker, there is less blood in the arteries; the pulsation grows smaller; the beats can no longer be counted, nor, finally, felt.

Has a sick person offered the foregoing symptoms, one is justified to pronounce him dead after respiration ceases entirely.

Asphyxy, or apparent death, is a condition in which the functions of life, while not entirely ceasing, fail to manifest themselves outwardly. Loss of consciousness, of feeling, even of the animal heat, are incidents; only the faculty of hearing is sometimes normally retained. This death-like state may endure for hours, even for a few days.

That a minimum of animation suffices to protect organic matter from decay, is proven by the plants in winter time, by insects while in the state of chrysalis, particularly by animals in their winter sleep.

From its causes there are distinguished different kinds of asphyxy:

1. Asphyxy from interior illness: A deep swoon after exhaustion by a fatiguing and prolonged march, after a difficult delivery, after prolonged starvation (as in the case of shipwrecked and insane persons), from vehement spasms, in cases of hysteria, epilepsy, and eclampsy, from Asiatic cholera in asphyctic stage, from some forms of yellow fever, typhus, tetanus, children's cramps, from asthma and asthmatic spasms, from poisoning by opium, prussic acid, chloroform.

2. Asphyxy from exterior troubles: From extensive and heavy contusions received by heavy corporal punishment (whipping post), grave concussions of the brain,

particularly after an explosion, from dangerous and numerous wounds resulting in a large loss of blood, large loss of blood by women in childbed, and by little children.

3. Asphyxy from specific causes. Asphyxy from irrespirable gases (inhalation of sulphuric and sulphurous vapors, of nitric acid and muriatic vapors, of ammonia and chloric gases); asphyxy of new-born babies; asphyxy from drowning, hanging, strangulation, from stroke of lightning, from heat, from rarefaction of air (lack of oxygen), from suffocation or being buried under wreckage, etc., from foreign substances in mouth or larynx.

Asphyxy is entitled to particular attention because of the possibility of burying alive an only apparently dead person.

Although the burying alive of a person is stated by the ignorant, and in sensational literature, to be of not rare occurrence, it must be admitted that the instances in which this has been proved are exceedingly rare.

The safest way to avoid any mistake as to death having set in is to wait for the *sure* sign of death. The premature burial of corpses, even aside from legal reasons, is a practice to be condemned.

The means by which asphyxy can be distinguished from real death, some of which will at the same time serve for reviving purposes, are as follows:

1. Respiration and the movements of the heart continue in asphyxy, though in a minimal degree; whereas they cease entirely if death has really set in. To ascertain their presence a small feather or a lighted candle should be held under the nose, or a small vessel filled with water is placed in the cardiac region and its movement observed, or a cooled looking-glass held close to the mouth to see whether it shows any moisture from breath.

Furthermore, the muscle activity is stimulated by smell-

ing-salts (spirits of sal-ammoniac), by tickling the nose, by irritating the skin with spirits of mustard, dropping burning sealing wax on the skin, sprinkling with cold water or pouring it over the body.

2. Apply mustard plasters or rub the skin sore in some places with a wet flannel or with brushes, till the epidermis is removed; if death has set in, the places whereon the poultice has been applied do not become red, nor do the parts rubbed show any exudation, but dry up soon and assume, after six to twelve hours, a yellow-brownish color of a horny and somewhat transparent appearance.

3. Spots of a bluish red hue (livores mortis) appear generally eight to twelve hours after death, first on the lower surface of the corpse, i. e., if it lies on its back, then on the back; if face down, on the face, the chest, and the abdomen.

4. One of the most decisive signs of absolute death is the rigor of the muscles. It begins in the lower jaw, in throat and neck, extends down the trunk to arm and leg, and disappears in the same order. As a rule, the rigor sets in from four to twelve hours, sometimes, but very rarely, after twenty-four hours, or already in a few minutes after death. The muscles, those that bend or stretch the limbs, become compact, shortened, and swollen, the same as when contracted in life.

5. The ending of the rigor coincides with the beginning of decay, which reveals itself by a cadaverous smell, by a greenish color of the skin, beginning in the lower abdominal parts, and by developing of gases in the cavities of the body and, later on, beneath the skin.

Infallible signs that death has taken place, are, therefore, in the first place, rigor and decay; in the second place, the livores (spots), the nature of preceding illness, and the agony.

The manner of death varies according to the organ which has caused the death. The organs through which the stimulus of life is fed to the rest of the body are: Lungs, heart, and the brain, with the spinal cord. On account of their importance for life, they were called by the ancients "Atria mortis."

Generally three different manners of death are assumed: 1. Death from the brain (mors per apoplexiam). 2. Death from the respiratory organs (mors per asphyxiam). 3. Death from the heart (per syncopem). It is very rarely that these modes of death occur absolutely, and then only by sudden death. Mostly, and in case of slower death almost always, a combination of the three modes has taken place; for instance, prevented respiration changes the composition of the blood and hinders its circulation in the brain and spinal cord; this again hampers the respiration and the activity of the heart.

Judiciary medicine, whose chief duty it is to reveal to the criminal courts a forcible manner of death, distinguishes the following modes of death:

1. Suffocation by hanging, throttling, choking, drowning, and other ways, cutting off the breathing with cloth or by hand, etc. 2. By bleeding to death. 3. Death by starvation. 4. Death by burning or scalding. 5. Death by freezing. 6. Death from poisoning.

It is beyond the scope of the present book to describe even only superficially the symptoms of these modes, especially as, though important in deciding a case, they are by no means determining, so that it is often difficult for the experts, who hold the inquest, to establish the cause of death after the autopsy.

The dead human body, the corpse, according to natural laws, soon decays, decomposes, and thereby may imperil the health of the surviving. The removal and burial of

corpses was, with all nations, one of the first hygienic measures ever taken.

The most common kind of burial is the interment. The first mention of burying in an earthen grave is made in Gen. xxiii. 3. Abraham purchased ground from the children of Heth to bury Sarah there. Heth's children, therefore, must have known the practice of burying the dead. All fire worshipers buried their dead; likewise the Buddhists; whereas the Brahmins practise cremation. Those of the Japanese, who are the offspring of Buddhists that settled there about 1200 B. C., still bury their dead; whereas cremation is practised to this very day by the aboriginal inhabitants, who follow the teachings of Kami.

The Chinese invariably bury their dead. It is known that their scattering of the graves not only is a menace to public health, but has offered the chief obstacle for the building of railroads in China.

The ancient Greeks both buried and cremated. Burying seems to have been the more common practice, as indicated by the many terms of the Greek language for burying in the soil.

Τάφος from θάπτειν signifies funeral, burial, and death meal. (Homer Ilias 25, 619, 680; Odyssea 3, 309; 4, 547.) Homer also uses the verb for cremating (without πνοί, Odyssea 12, 12; 24, 417, and Ilias 21, 323), for the entombment of the bones collected in urns and their burial in a grave of clay (Odyssea 11, 52). At a later period the verb was generally used for the burial of the corpse; just as the Roman *sepulchrum* was used both for the burying of the uncremated corpse as well as for the interment of the ashes.

The Evangelists use but μνῆμα or μνημεῖον, only Matthew, when referring to the Pharisees, uses τάφος.

σπήλαιον or σπηλάδιον in distinction from the brick tomb, means a natural rent or hollow in a rock, which was used for burying purposes, as, for instance, the grave wherein the younger Nicodemus had the Saviour entombed.

Sepultus, according to Pliny, means any corpse buried in a grave, whether the whole corpse or only his incinerated remains. *Humatus* is used by the same author for a corpse interred in a dug pit, and covered up with earth.

The first Christians buried their dead in the common graveyards, but apart from the heathen. Pressed by the persecutions of the Roman emperors, the Christians in Rome were soon compelled to bury their members in stone caves. The burial in graves was at all times the custom of the Church, and it is the only one which she allows. In recent years cremation in specially constructed furnaces has come into practice again. It is, however, prohibited by the Church.

The process of decomposition of the buried corpse is completed in from six to nine months. The cavities of the body, even the strong skull, burst from the pressure of the gases formed. The soft parts liquefy, flow through the coffin and ooze into the surrounding soil. This has caused much apprehension; but there is no danger of contamination if the cemetery is properly managed. The process of decomposition of corpses is so gradual that the living can not possibly be endangered or annoyed. No specific poisonous gases, as formerly erroneously assumed, are formed. The emanating malodorous putrescent gases are absorbed by the soil so thoroughly that even during an exhumation a smell is rarely noticeable.

Buried corpses can not spread a disease, for the reason that the infectious bacilli can not escape from under ground. In the course of putrefaction they are, moreover,

soon destroyed by bacteria of decomposition. As a fact, there are no accredited statistical proofs for a greater mortality or more frequent infections among people dwelling in the vicinity of cemeteries.

In cases of exception, the corpse in his grave does not decompose, but mummifies. The corpse dries up, maintaining his exterior form.

Mummification occurs in case of poisoning by arsenic or sublimate, also under certain local conditions, as where there is cold, sharp, drying air present in the vaults. Such conditions prevail in a monastery of the Capuchins near Palermo, in the monastery on Mount St. Bernard, and at other places.

In order to avoid danger to health, and annoyance to living people, the following rules should govern in the laying out and running of cemeteries:

The ground should be open and elevated. The pious practice of our ancestors of building the cemetery around the church must be disapproved of, for sanitary reasons. Sandy soil, possibly mixed with loam, is best. The underground water must be at a considerable distance from the surface, lest the bottom of the graves be reached by the water. Dwelling houses should be at least ten yards from the cemetery; wells at least fifty yards, if the underground water flows toward the wells. The suitable dimensions for a grave are two and a half yards by one yard. Between two graves there should be a space of at least a half yard. For the graves of adults a period of twenty-five years should be allowed, for those of children one of twenty years. Local conditions, the character of the soil, the state of putrefaction as observed in exhumed remains may justify a departure from the average period. Particular precaution is required in making a second layer of corpses, made necessary sometimes through lack of space

and through a large increase of the congregation. The second series of graves will not be dug the full depth, but only far enough to reach about the coffin below. The mound must be earthed up as high as possible, and the acquisition of a new cemetery at the earliest possible time should be insisted upon.

The erection of buildings on old cemeteries is only advisable at least forty years after the last burials.

Trees may be advantageously planted in cemeteries in use, but not too near together, lest the circulation of air be obstructed.

If it is foreseen that the present space of a cemetery will not remain equal to the demand, or if it should entail some danger to health which can not be obviated by improvements, then the religious or political communities, who are to care for the interment, should in time look out for a new cemetery, or the enlargement of the old one, lest the acquisition of a suitable ground be prevented by the building of dwelling-houses.

Concerning the interior disposition and the management of cemeteries, the following is recommended:

1. A cemetery should be at a distance of at least two hundred yards from the outskirts of the town or village. In each particular case, however, it requires a thorough examination whether that distance is safe, or whether possibly a shorter distance be permissible.

2. The cemetery should, if possible, be on a higher level than the residences in the neighborhood. Conditions being equal, grounds situated to the north or east of the town or settlement should be preferred.

If drainage is necessary, as, for instance, in case of moist soil, low or slanting ground, vicinity of wells and waterway, or to prevent water from flowing into the cemetery, then a suitable ditch is to be dug at the proper places.

The burial ground must be fenced in, by dense, if possible, thorny bushes at least one yard high, or by a brick wall, or a strong wooden fence of at least one and a half yards high. There must be at least one gate, that may be shut or locked, and large enough to allow vehicles to enter.

3. Plants should be fostered on cemeteries, but they must not keep the sun from the graves. Shade trees should only be planted on broad walks, and at due distance from one another. Fruit-bearing trees and poplars should not be planted at all. Of plants those of the evergreen kind are to be recommended.

The fields must be leveled, covered with turf, and separated by roadways, covered with gravel or sand. Between the rows of graves there must run a pathway leading to the graves.

In towns and larger places the erection of a vault for the dead should be advocated, where the corpses, especially of those who died from a contagious disease, or of unidentified, may be received and cared for in a safe and dignified way; where parties at a funeral may find shelter in inclement weather and where the coroner's autopsy may be held.

Monuments upon graves must be preserved in good condition by the owner, as long as he has a claim upon the plot on which it stands.

Monuments, in designs and inscriptions, should conform with the views of the Church. Care should be taken that inscriptions may not cause offense by their contents.

4. Gravediggers are to be employed at certain wages.

The following rules for the gravediggers are to be recommended:

(*a*) The grave should have a depth of two yards, sufficient length and width, to receive the coffin without hindrance.

(*b*) The placing of the coffin in graves containing water or mud is inadmissible.

(*c*) In exceptional cases, if made necessary by rocky ground or the presence of water, the coffin may be buried nearer the surface; the cover must, however, be at least one yard under the surface.

(*d*) Each grave must be separated from the next by an upright, strong earthen partition of at least a half yard.

(*e*) To bury two or more corpses in one grave is only permissible, if the sanitary regulations covering such cases can be complied with. Under all circumstances must it be insisted upon that the uppermost coffin is at least one yard under the surface.

In cases of emergency, as in the time of epidemics, the local board of health will take charge of these matters.

(*f*) As a rule a period of twenty-five years is to be allowed to a grave, before put to use again. Local conditions, that tend to accelerate or retard decomposition, may make a modification of this period necessary.

(*g*) If, in digging a grave, not fully destroyed parts of a corpse or coffin are found, they have to be lowered under the bottom of the new grave; if, however, whole corpses not decomposed are found, then the graves must be filled up immediately and left alone.

(*h*) Each new grave must be marked by the digger on the map and numbered. The grave must bear the corresponding number.

(*i*) The gravedigger shall keep a book containing the full name, birthday, day of burial, and the number of grave of every person buried in the cemetery.

It is, of course, necessary that a certain rotation of graves is observed. Moreover, the one in charge of the cemetery must be well acquainted with any variation in

the nature of the soil occurring in the cemetery ground that may necessitate special measures of precaution.

A " Potter's Field " for paupers, unknown persons, and criminals, may also, in many instances, have to be provided for.

SECOND PART.

PASTORAL MEDICINE.

The Relation of Man in His Bodily Conditions to Religion and Morality.

SINCE times immemorial man, in his thirst for knowledge, has questioned: Whence do I come? The query is answered in a scientific, historical sense by anthropology —a science of only recent date, devoted to the natural history of man and his position in the order of organic life.

For a time it seemed, at least to prejudiced investigators, as if anthropology would leave the Christian doctrine of the creation of man, and of his history, without a leg to stand upon. It soon became a favorite theory that man, by natural evolution, had risen from the lower order of organic beings and that he, in a certain way, was but the final link of the animal order. His next kin were the man-like simians. In the opinion of these scientists, there exists a greater breach, in physical and mental respect, between the civilized Caucasian and the uncivilized savage, than between the latter and the most human-like ape.

To support this view, the fossil man was enlisted. The remains of primitive man, as found within the geological formation of the diluvial, were proclaimed to point to a man entirely different from the one that lives to-day. The missing link between man and ape had been found.

All these deductions in favor of the materialistic theory of origin of man, however, soon proved visionary. Sober observers, thorough investigators, in interpreting ana-

tomical and paleontological discoveries, arrived at different results. It was proved that primitive man was not essentially different from the human generation of to-day.

The exact, anthropological, science not only brings to light nothing contradictory to the Christian doctrine of the creation and unity of origin of mankind, but furnishes even supporting evidence for it.

If the unbelieving, but honest, scientist, when confronted by the question about origin of man, confesses his "Ignoramus," then the believer finds consolation and information in the words of Moses: "And God created man to his own image."

However interesting these scientific contemplations of the history of mankind may be, an exhaustive treatise of this subject, of the relation between nature and revelation, would vastly transgress the scope of this work.

Therefore, we turn to the individual Man, to investigate his various stages of life in their relation to the Catholic religion and morality. And here the genesis of the individual claims our first attention.

I.—Procuratio Abortus.

Procreation is the impregnation of the female ovary-cell by the copula carnalis. The embryo or fetus develops in the womb until the end of the fortieth week. Then able to live outside the womb, it is discharged by the act of delivery, and is born a full-time child. The premature interruption of the life of the fetus in the uterus and its discharge from the womb are called abortion.

Abortion may be spontaneous, i. e., without traceable mechanic or dynamic cause (miscarriage). Diseases of the procreators, or of the ovum, may be the causes, especially

constitutional syphilis. The dying off of the fetus, owing to syphilis, within the first months is very frequent, whether the father or mother be the diseased party. This kind of abortion, not important for moralists and criminalists, does not interest us as much as the purposely interrupted pregnancy by mechanical and dynamical means. A wilful abortion is tantamount to destroying a human being—it is murder.

With conception the foundation is laid for the perfect man, only he vegetates in his beginning among surroundings different from those of his future life. The contention of St. Thomas that the *anima rationalis* appears only toward the end of the intra-uteral life is repudiated as erroneous by theologians and jurists. According to the order of natural laws given by the Creator, the act of procreation is a single one. By this act body *and* soul are called into existence. Even simple observation suggests this theory. With the act of procreation mental and physical qualities of the procreators are imprinted upon the future human being. The hereditary endowment, or the hereditary fatal evil inclination, is present.

Criminal abortion is practised by pregnants, both unmarried and married. The former are driven by shame to this sinful manipulation; but it is also not uncommon for married people to take recourse to this reprehensible means to escape the burden of providing for children.

With uncivilized and savage nations abortion is a common practice and one of the reasons for their extinction. That this crime is practised in strata of society that claim to belong to the most cultured, transpires from time to time from the records of the criminal courts.

The question arises, To what extent is abortion permissible in medical practice? The moralists teach: "*Nunquam licet directe procurare abortum.*"

The ancients were quick to resort to abortion. In ancient Rome professional abortionists were quite common. Christianity counteracted this criminal practice, as well as everything heathen.

Modern obstetrics and gynecology know, in fact, only two conditions where abortion enters into question as a last resort. They are the incarceration of the pregnant womb in the small pelvis, and uncontrollable vomiting of the pregnant.

Viewed from the Catholic standpoint, is the operation under such conditions permissible or not?

The Holy Office has decided that under no circumstances is abortion permissible. This decision has been severely criticised by the medical fraternity, but to the believer it is the only consistent course. An excellent and exhaustive statement of this question, and a convincing defence of the Catholic position, is found in the recently published book, "The Right to Life of the Unborn Child," by Professor H. Treub et al.*

If miscarriage has taken place, the human being at this early stage of development will become an object for pastoral care. Any living embryo is a human being. An unbaptized person can not enter the kingdom of heaven. *Nisi quis renatus fuerit ex aqua et Spiritu Sancto, non poterit introire in regnum Dei.*

It is undoubtedly the duty of the parties next concerned to baptize a fetus upon its discharge. The term "next concerned," or present, recalls the preception of the Rituale Rom.: *"Pater aut mater propriam prolem baptizare non debent, praeterquam in mortis articulo, quando alius non reperitur, qui baptizet."*

The fruits at the first period of pregnancy are always

* "The Right to Life of the Unborn Child," etc. Published by Joseph F. Wagner, New York.

"*in mortis articulo,*" in most cases death has set in before the birth. For this reason I hold that a fetus just discharged, if not more than five months old, should only be baptized *sub conditione.*

In the case of a miscarriage in the first months the fetus, at the very first, is parted from its feeder, the wall of the womb. This, at first, hinders, and eventually entirely checks, the supply of the indispensable arterial blood from the blood vessels of the mother. In view of the slight development of the tissues and organs of the fetus, it is out of question to assume that it can survive for even a moment the withdrawal of that element of life. Considering further that there is an interval between the time when the fetus parts from its feeder and the time of ejection, one may safely assume that these fruits are dead.

The view taken by some that the fetus is almost always discharged alive, or that it frequently lives thereafter for twenty-four hours, is erroneous. The possible existence of life might be assumed when, after a short travail, the fetus with the membranes would be quickly discharged. In that case there would be no objection to baptism by immersion, *sub conditione,* after bursting the membranes.

I often was reminded of the words of Our Lord, "Cast not pearls before the swine," when in my practice I have seen how midwives perform the act of christening on discolored, putrid fetus or shreds of membrane. It likewise impairs the dignity of the clergy to expect of the priest to look for and christen the fetus after miscarriage.

The priest will have fulfilled his duty by requiring those concerned to conditionally christen any fresh fruit of the body, born after a short travail. The holy rite should, however, not be performed on putrid fetuses or tissues.

II.—Birth—Care of the Child.

Through the act of birth the mature fruit is discharged and the independent life of the individual begins. Though a natural event, birth stands upon the borderlines between physiological and pathological conditions of the body. There may occur at any moment a turn into sickness. Birth being a matter of several lives, it is only natural that pastoral care is largely interested in this event, especially because the newborn—sometimes there are more than one—has not yet been christened. On account of the danger attached to childbirth for the mother, it is a good Catholic custom that she partake of the holy Sacraments shortly before delivery.

During the delivery various things may happen to put the mother's life in jeopardy. In first place, the cramps of parturient women (*Eclampsia parturientium*).

In this condition the woman in labor is suddenly thrown into general spasms; the face gets contorted; trunk and limbs are in convulsions. The child may yet be in the uterus or be born already. The physician must act promptly and energetically to avoid a fatal result. After the first attack, the Sacraments should be administered to the patient, for there is generally a repetition of attacks, followed by loss of consciousness, and often by death from apoplexia.

Another condition of sickness with a mortal tendency are hemorrhages during or after delivery. The cause for one kind of these hemorrhages is an aberration of nature, disastrous for mother and child alike: the irregular seat of the placenta in the lower section of the womb, in front of the child. The mother must receive the last rites in this instance. This precaution should also be

taken in any case where the childbirth requires the use of instruments or of operation.

The matter in question for the child is the administration of baptism. According to the teachings of the Church, everybody may christen in case of need. If the child *intra partum* is in danger of life, then midwife or physician is bound to perform the rite.

First, the question is to be settled whether or not the child can be validly christened while in the womb. The necessity for this baptism arises always when an operation dangerous for the fruit is to be performed. Gury asserts the validity of this baptism, as being quite evident. Is one of the limbs of the child developed, then baptism is administered thereon. According to the rules of the Church, the baptismal water must touch the body of the child to be baptized, the enveloping membranes must therefore be opened. On the head the administering of baptism may be *aspersione* or *ablutione,* by a versed hand, perhaps also with a clean syringe, if the ablution by the finger dipped in water should be regarded insufficient, although Gury holds it to be sufficient. Midwives should by no means be advised to apply a syringe for that purpose, because there is danger of injuring and infecting the womb, which may lead to childbed fever. I mention this because Gury speaks of christening in that manner.

It transpires from the above statement that baptism is invalid if administered to a child which, though born, is yet surrounded by membranes. The exterior membrane comes from the mother, and is, therefore, no part of the child. Therefore, it was necessary, while speaking of the baptism of the fetus in the first months, to demand the bursting open of the membranes. The administering of baptism on the navel string is likewise inadmissible, it being no direct part of the child.

Brief mention is here to be made of abnormal fruits. These misformations of the wonderful structure of the human body die soon after birth. Being undoubtedly human beings, they should be christened forthwith. It may serve as a rule that any fruit possessing head and breast may and should be christened. The rare deformity of *acardiacus* consists only of a kind of trunk and rudiments of limbs. It occurs in cases of pregnancy with twins, and can not be considered as an individual.

Care of the Child.

Every mother, capable thereof, is, according to natural law, in duty bound to nurture the child herself. It is for the physician to judge whether, in view of conditions, she should be dispensed from that duty. Too many women shirk this duty for trifling reasons, fondness of pleasure, vanity, etc. The next and most natural substitute is a wet-nurse. In engaging a wet-nurse not only her bodily qualities are to be considered, but also her mental and moral qualities. The adage says rightly of a character trait it was fed to its owner with the mother's milk.

There is another drawback to wet-nursing. The own child of the nurse, if alive, is intrusted to the care of another woman. Statistics prove only too clearly, with fearful figures, how mortality ravages among these foster-children.

In ancient times the father had the right to decide over life or death of the newborn child. Abortion, abandoning, or killing newborn babes were not considered criminal deeds. Only under the influence of Christianity it was realized that even the helpless newborn are beings endowed with the right to live. Already the very first fathers of the Church have declaimed with impressive

words against these crimes against the immature human being, or the one who has just stepped into existence.

On part of the state, Emperor Constantine made infanticide a capital crime. It was, furthermore, decreed that the state should provide for abandoned children.

In the following centuries it was the Church exclusively who championed abandoned children. Many churches on the Rhine and in Gaul were provided with marble receptacles in front of their doors. The children deposited therein were intrusted to the care of worthy people. The first home for foundlings was established by Archbishop Datheus, of Milan, where foundlings received at the church doors were taken in, cared for by wet-nurses, and raised up to their eighth year. By and by similar homes were founded in Italy, France, Spain, and Portugal. Most of them were under direct supervision of the bishops. In the seventeenth century the state again began to attend to the improvement of social and sanitary conditions of these children. The caretaking of these poor and abandoned children in homes for foundlings is called the Roman system; whereas their intrusting to the care of foster-mothers is called the German system, there being no foundling homes in Germany. After this brief historical deviation, let us return to our starting point.

The infant leads at first a vegetating existence, notwithstanding this its mental faculties develop with the increasing growth.

The chief requirements for the welfare of the youthful body are a healthful nourishment, fresh air, and a good care of the body, especially of the skin.

Special attention must be directed here to a nuisance, which at present is spreading more and more, to the detriment of the little ones. I refer to the misuse of alcohol in the child's sphere.

It is nothing uncommon to meet a mother, who, in her anxiety for the growth of the child, gives it a rich wine, so that it may grow strong. She has no physician's prescription to show to warrant the use of strong alcoholic wine. The pernicious results of the misuse of alcohol at an early age have been stated in an excellent manner by the late Dr. R. Demme, for years chief physician of the hospital for children at Berne.

One of the most common and injurious mistakes in raising children is, according to Demme, to let them partake regularly of alcoholic beverages. Ill-placed kindness, thoughtlessness, also wrong impressions of the hygienic influence of alcoholic drinks upon the organism of the child, cause the parents to let the children share in such drinks.

The injurious effects of the misuse of alcohol on grown people appear also on the organism of children, only sooner and to a larger degree. Immediate consequences are indigestion of all sorts, nervous disorders, especially the notorious nervosity. Primarily it leads to drunkenness itself, which is directly nurtured by the habit, inasmuch as the stimulation to which the child gets early accustomed requires more and more to be satisfied.

"We must endeavor," says Dr. Demme, "to keep children from using alcoholic beverages as a drink. It is the physician's duty to enlighten rich and poor in respect to the danger lurking for children in the early use of alcoholic drinks."

This concerns the *habitual* use of alcohol by healthy children. It is an entirely different matter when the *sick* child for a time being is given alcoholic beverages on prescription by and under supervision of a physician, when unavoidable in the treatment of children's ailments.

I know of two cases—both from the practice among

the poor—where, at a festivity, children three and five years of age became intoxicated by whisky. They became idiotic immediately after disappearance of the severe symptoms of intoxication, stupor, etc.

The Child at School Age.

At the age of six years the child must go to school. The prevention of injury to health while at school was discussed in the first part, under the heading "Hygiene in Schools."

The attention of the pastor may be called to those among the school children who present a deviation from the normal: the stuttering and feeble minded.

Stuttering results from an imperfect influence of the will upon the muscles and organs of speech. Words or sentences can only be uttered after repeated efforts, sometimes accompanied by a jerk or a convulsion of the entire face. The trouble is intensified by embarrassment and anxiety. It is, therefore, quite common that a stuttering child is never cured in a public school from his defect.

A special exercise is here required for the group of muscles active in the formation of sound and in speaking. Improvement or cure can only be derived from taking a course for the healing of stuttering, or from a stay at an institution where this trouble receives methodical treatment. If the priest fails in this case to enlighten by word and advice, this defect will often be regarded as a bad habit and be left to itself. More aggravated is the condition of children mentally weak. These beings are a hindrance, yet the weak mental faculty which they possess can be developed. Convincing proofs thereof are the results gained in institutes for idiots. If a mentally

stunted child remains with his family, there is, as a rule, no progress to be expected; it remains stationary on the step of its arrested development. Such is its fate, especially, if it belongs to the poorer populace, and if the pastor does not intervene in its behalf.

In such cases the prejudices of the parents can often be overcome only with great difficulty.

The hygienic aspect of the Church law, which binds the person in good health, from his seventh year on, to abstain from meat on certain days in the year, has already been discussed.

III.—Matrimony.

Development of sexual maturity begins with the fourteenth year, sometimes sooner or later. It is especially the sexual instinct, the most powerful human instinct besides *auri sacra fames,* which requires the particular attention of the priest. The strange bodily functions which appear at this stage of life incite attention, cause at first innocent touch, but may readily clear the path for vice, if the fear of God is wanting.

The only legitimation of sexual intercourse is matrimony, and the main purpose of marriage is the propagation of mankind.

We refrain for obvious reasons from discussing at this place the *materia turpis* of the moralists, which the clergyman finds amply treated in his Latin handbook on Moral Theology. Some space should, however, be given here to one of the impediments, the *Impedimentum Consanguinitatis,* since it has an important bearing upon hereditary oneration, of which there is such frequent mention made in the following chapters.

Impedimentum Consanguinitatis.

The establishment of consanguinity and its grades is a task for the canonical matrimonial law. Natural science furnishes the reasons for the prohibition.

The law of Moses already forbade marriage between kinsfolk. In the early restrictions made in this direction stress is laid more upon the moral principle violated by such unions than of the harmful consequences resulting therefrom. This is especially the case in the law of Moses, and the impediment is consequently not based upon an idea, or the will of the lawgiver, but it is even considered as self-evident and demanded by morality.

The effects of a violation of this natural law, as already observed at an early time, are confirmed by investigations in modern times. Such marriages in nearly all cases result in corporal defects of the offspring: of five children born in kindred wedlock, one only is normal. Most disastrous for the progeny are marriages consummated between the immediate offspring of two sisters. Less dangerous proves marriage between the son of the brother and the daughter of the sister, and vice versa. Still less danger lies in marriage between the children of two brothers. These three grades of consanguinity are the most hazardous for the offspring.

In a lecture on marriage between cousins Darwin, referring to the investigations by his father, says:

1. Consanguinity of the parents is injurious for their children.

2. Where children seem to remain exempt, the injury may appear in the grandchildren.

3. These unions are more a source of idiocy and dullness than of the forms of madness.

The first question contained in the application form for admittance of a patient to a public insane asylum reads: Were the parents or grandparents of the patient blood relations, and in what degree? Which tends to show that, according to modern psychiatry, consanguinity plays a paramount part among the causes for mental disorders.

According to Bauregard, there resulted ninety-five children from seventeen investigated intermarriages between blood relatives. Of these, twenty-four were idiots, one deaf, one a dwarf, thirty-seven tolerably normal, the rest in good health. In forming the embryo, the procreative cells, male and female, come together; consequently, the fruit in building up its parts can but follow one or the other of the parents. In so far as it takes after the father, it must cease to be like the mother, or vice versa. In this way, by prevalence on one part, the entirely healthy let us assume, the influence of the other, perhaps weaker part, may be counterbalanced.

As a matter of fact we know crossing of races as a means of preventing degeneration; whereas, as it is known, certain family traits and family diseases are carried to the extreme by continued intermarrying among kins. Especially is it known that cretinism and idiocy are spread by marriages among blood relatives, and checked by marriages with persons of another stock or country.

The same applies, though in a lesser degree, to deaf and dumbness.

The marriage of blood relatives results also often in sterility, or abortion, or in sickness among the progeny, especially in an impaired vitality and in deformities. A commission, with Dr. Morris as chairman, has investigated the subject and published the following table (New York, 1859):

KINSHIP	Number of marriages	Number of children	Children in good health	Children sick or deformed	Percentage of sick or deformed children
Cousins of third degree.....	13	71	42	29	40.8
" " second "	120	626	360	266	42.5
" " first "	630	2911	955	1956	67.2
Descendants of cousins.....	61	187	64	123	65.7
Uncles and aunts with nephews and nieces.....	12	53	16	43	81.1
Double cousins.....	27	154	21	133	96.4
Incest in its full sense.....	10	31	1	30	96.1

IV.—Celibacy.

The Catholic Church demands celibacy of her priests. Ever since the great Gregory has carried out his principle: "*non liberari potest ecclesia a servitute laicorum, nisi liberantur clerici ab uxoribus,*" to this very day, has this institution of the Church been vehemently assailed. The preeminent justification of celibacy, the dogmatic, is here beyond discussion. A main objection is the following: Celibacy is impossible; therefore immoral. Let it be answered by an unbiased and unobjectionable observer:

"We have already mentioned how essentially the sexual impulse differs from all other instincts, and how and why it lacks the unconquerable character peculiar to the rest. No other instinct, therefore, can be, and is, bridled to such an extent by reason and morality than the sexual impulse" (Dr. Casper).

By pledging celibacy, the rule of the will becomes supported and fortified by supernatural motives. The importance of education is, furthermore, not to be underrated. Abstinence decreases the *libido sexualis.* The

Church, therefore, rightly pays great attention to the training of her clergy. Professor Schreyer, of Halle, a Protestant, in his manual of Pastoral Medicine, says anent:

"Without weighing the reasons for or against such a Church law, i. e., *votum castitatis,* it is only the question, How is it best kept by young teachers of religion? First of all, pains must be taken, already in the seminaries, for raising young men for the clergy, that they may be fitted out with such physical qualities, besides religious and moral, that they may be able to ply their vocation without hindrance, and to keep a law which to violate is offensive enough. Hence no one should be ordained a priest without having been trained to morality and integrity by piety, temperance, work, and good example, or without having been subjected to extensive trials, both physical and moral."

At any rate, the experience, gleaned in the centuries since this institution exists in the occidental Church, teaches that it is just the celibacy which imparts to the Catholic priest the authority and dignity indispensable for his vocation.

Even the bitterest opponents of this clergy must admit that in regard to morality no stone can be thrown at it, may the stooping down to pick one up be ever so easy.

Besides, there are many more reasons which speak in favor of this law. Matrimony would be a hindrance for the priest in exercising his office at the sick-bed, in the confessional, in mission work.

Simply for the sake of their historical interest, not because they are valid, we touch upon the objections against celibacy as being injurious to health.

From Jovinianus the Monk (388) opposed by St. Je-

rome (*contra Jovinianum liber*) and St. Augustine (*de bono matrimonii*), down to the representatives of the Salernitan school and the Arabian physicians, the claim was raised during the entire course of the middle ages, of celibacy impairing health. In the era of reformation this identical claim served many a cleric who, in his heart, had already renounced celibacy, as a pretext for shaking off the cumbersome fetters. The French encyclopedists, of the second half of the eighteenth century, poured forth their jeers and sarcasms against this ecclesiastical institution, partly to have it abolished on account of detriment to health, partly to be able of transforming their slogan " Écrasez l'infame " into deed with chances of success.

Unbiased physicians of all ages never believed that celibacy would impair health, a truism taught likewise by daily experience in other professions. Of a former period may only be mentioned here Albrecht von Haller (1708-1777), a remarkable savant who ruled in philosophic, mathematic, and historic domains, and who is, according to Andrew Vesalius, the founder of modern anatomy and physiology. " This great man," says Hyrtl, " died with his finger upon the radial artery, and with the words, ' It pulses no more ! ' Even his last thought was physiology." Also Peter Frank (1745-1821), an eminent clinic, defended celibacy.

Statistics also were pressed in service against the vow. They show that married people of both sexes live longer than unmarried.

According to Dr. Casper, a husband enjoys the prospect of reaching the age of sixty years; a bachelor must rest content with forty-five years. Whereas one-fourth of husbands attain an age of seventy years, it is only the twentieth part of bachelors that reaches that age. Among

lunatics and suicides two-thirds to three-fourths are single. The orderly and regular way of living, incidental to matrimony, is taken to be the explanation of the above figures. However, there can be no doubt that this very cause applies, at the least in the same degree, to Catholic priests as it does to married men. The quoted statistical results, therefore, can not include the clergy.

Celibates are also the members of both sexes of Catholic orders, who have devoted themselves to this vocation in obedience to the evangelical counsels for the sake of self-perfection, and to the weal of their fellowmen. Of particular interest are orders devoted to nursing the sick, inasmuch as it can be proven of them by figures that their members are directly victims of their vocation. A member of those orders may eminently say of himself, *Aliis inserviendo consumor.*

There are two contagious diseases, tuberculosis and typhoid fever, which claim numerous victims from among the members of orders devoted to nursing. In an investigation, by G. Cornet, of the mortality in orders that have for their object the care of the sick, regard is only paid to Catholic orders, both male and female. The inquiries made of religious communities for this investigation cover a period of twenty-five years and refer to cause of death, age, the number of years passed in cloister, duration of sickness, and occupation of the deceased; also age and number of the yearly recruitment.

According to reports from thirty-eight cloisters, averaging yearly 4028 sisters and brothers, and an aggregate personal age of 87,450 years, the cases of death in 25 years numbered 2099, whereof 1320, or 62.88 per cent—nearly two-thirds—had been stricken with tuberculosis; whereas, in general only the one-seventh to one-fifth part of deaths are due to tuberculosis. In one-half of the com-

munities this average—two-thirds—was even surpassed, and increased in some of them to three-fourths of all deaths.

Remarkably great, according to returns, is the mortality from typhoid fever, with 8.23, and from cancer, with 2.38 per cent.; while death cases from other sicknesses are within the normal average. Most deaths occurred between the ages of twenty and fifty. Most of the deceased brothers or sisters were from forty to fifty years old.

With older age mortality decreases in these orders, in contrast to the fact that absolute mortality increases in general up to the seventieth year. This is explained by the avalanche-like rise of mortality in the younger years. As a consequence, but few reach a middle, to say nothing of an older, age, and the absolute number of those who die at an older age must necessarily be small in view of the fact that but few survive their fiftieth year. By adding to these 2099 deaths 162 cases of death from communities which reported only age, not cause of death, we arrive at an average life of 36.27 years for these 2261 death cases, which proves an increased mortality; this is the more striking because those 2261 deceased were by no means in previous bad health; on the contrary, they must have been strong and healthful when taking the vow. In some cloisters the average age amounted even to only 30 and 28 years, and was, therefore, lower than is the case in any other profession.

The reason for this great mortality among the members of orders devoted to nursing the sick is the frequency of their contracting typhoid fever by way of contagion, while following their vocation. This is illustrated by the following table of mortality in the Catholic orders devoted to nursing.

DEATHS WITHIN TWENTY-FIVE YEARS AT THE AGE OF:

CAUSES OF DEATH	15-20 years	20-25 years	25-30 years	30-40 years	40-50 years	50-60 years	60-70 years	Over 70 years	Total
Tuberculosis.....	14	164	348	525	201	43	19	6	1320
Typhoid Fever...	5	41	54	47	19	10	1	—	177
Cancer.....	—	—	2	12	15	13	7	1	50
Among a total number of deaths of..	23	243	472	711	347	150	100	53	2099

A comparison of the general average mortality with that in orders caring for the sick yields the further result that the relative mortality in such orders at the ages from fifteen to twenty, figured on an equal number of living persons, is four times that of those living in the world; at the ages from twenty to thirty, three times; at the ages of thirty to forty, double that of the others; while from the fortieth year up, the mortality in both are about even.

In considering that just such functions to which the greatest danger of contagion is attached—cleaning of the sick rooms, making the beds, handling the linen and bed clothes of tuberculous, soiled with sputum and discharges—are chiefly performed by sisters in the first years of their duties, because growing age is not equal to the hard work, one finds the explanation why the number of the infected decreases among sisters with progressing age, and is most frequent during the first years.

In the orders included in these statistics there died, during twenty-five years, sixty-three out of one hundred nurses of tuberculosis. To the age of fifty this disease constituted never less than one-half, mostly three-fourths, of the aggregate causes of death. Tuberculosis reaches

the climax at the beginning of the third year of hospital work.

According to the findings by Cornet, a healthy young girl, devoting herself to nursing at the age of seventeen, meets her death twenty-one and one-half years sooner than the rest of the people of the same age. A nurse at twenty-five, regarding the years of life allotted to her, stands on a par with a fifty-eight year old person outside of the cloister; a nurse at thirty-three, with one of sixty-two.

In due consideration of all conditions entering in question, the sole and only cause for the increased mortality from tuberculosis and typhoid fever can only and solely be attributed to nursing the sick. The assumption that cloister life in itself, especially on account of celibacy, entails danger to health and existence is entirely unfounded.

MAN IN SICKNESS.

If the well-feeling of a person is disturbed, if some organs fail to function in a proper way, and if thereto is even added a disorder in the normal form or connection of one or more organs, then the person is sick. Health and sickness are relative and conventional perceptions; they are not absolute counterparts. In olden times men were accustomed to regard sickness as something foreign to the organism, something obtruded, something isolated from the life of the other parts of the body. Some even went so far as to personify sickness.

Many expressions used in ordinary life, as for instance, "Sickness attacks the body," "The body wrestles with the disease," "The physician fights sickness," "Nature proved victorious," rest upon this philosophical view of somatic (corporeal) processes. To fully perceive the error

contained in this personification and detachment of sickness, we must consider that the sick parts continue their connection with the rest of the body, are fed by the same, and that circulation of the blood, the influence of the nerves and change of substance continue in the sick just as in the healthy parts of the body. Diseases are nothing absolute, nothing fixed, but processes wherein the single appearances run their course in the human body, one after the other, at fixed intervals. They are compound processes, like, in state of health, digestion, or nutrition. What we call sickness, is only an abstraction. In nature there exist only sick parts, sick persons, but not a tangible thing, sickness.

The processes of sickness come to pass chiefly in the body—somatic diseases; or they affect his mind—psychic diseases. In making this distinction between diseases, it must be mentioned that in the case of psychic disorders a part of the body is also sick—the brain, the organ of spiritual life.

I.—Somatic Diseases.

Among the diseases of the body we distinguish especially those which start with fever and those which run their course without fever. The most striking symptom of feverish diseases is the rise in the temperature of the body. It can be noticed from the sparkling eyes and the reddened face of the patient. The appetite is poor, the tongue covered with a white, dirty, or dark substance; the patient calls for nothing but drink. By applying the back of the hand to the skin of the patient, an increased warmth can be felt. This is a subjective way of taking the heat; the objective way is by the use of a special thermometer for the sick. In taking the temperature of persons, that part of the thermometer containing the quicksilver is usually

put under the axilla (arm-pit) of the patient, who, to hold it fast, must press the arm against the chest. After having remained in this position for a quarter of an hour, the thermometer is taken up again and read. A maximal thermometer continues to show the indicated highest temperature of the patient even after having been removed from his body. This kind of thermometers must, before use, be slightly shaken in order to bring the quicksilver down to its lowest level.

Of all feverish ailments, the infectious diseases attract particular interest. All infectious diseases run their course with fever, but not all fevers are due to infectious diseases.

Among the infectious diseases are reckoned all those forms of sickness caused by an organic sickness-inciting germ (bacillus) which has entered the body of the patient from outside and propagated therein. Diseases incited by animal parasites are termed diseases by invasion. They are not counted among the infectious ones. It follows, from the reproduction of the bacilli in the sick human organism, that all real contagious diseases can be continuously transferred from the sick to the healthy, so that the patient constitutes a direct transmitter. The infectious diseases spread in this way are called contagious (tuberculosis, diphtheria). Is the infection caused by the surroundings of the patient which the bacilli infected without his cooperation, then the disease is called miasmatic (malaria).

Considering the manner in which infectious diseases spread, the resisting power of their germs against outside influences are of the greatest significance. Germs of diseases of least resistance against outside influences are those of hydrophobia and of veneric diseases. An unconscious infection is here impossible, except in the rarest

cases; on the contrary, only by a direct contact between sick and healthy can these diseases be transmitted.

Germs of diseases of greater resistance are those of acute exanthema: Small pox, measles, scarlet fever, diphtheria, tuberculosis, typhus, and Asiatic cholera. These germs can preserve themselves in the most varied parts of our surroundings after having left a sick body. Hence, in order to prevent the last named infectious diseases, it is of utmost importance to know the objects which enter most frequently into consideration in their quality as sources of infection, and also the means by which germs are transferred from the sources of infection to the healthy person.

(*a*) Sources of infection. Sources of infection for contagious diseases are:

1. The discharges of the sick, like saliva, sputum, pus, excrements, dandruff. They constitute the sole sources of infection in the case of hydrophobia and veneric diseases.

2. Their linen soiled with discharges, bandages, beds, and clothes.

3. Eating and drinking vessels. Objects named under 2 and 3 are sources of infection in case of acute exanthema: diphtheria, tuberculosis,, erysipelas, typhoid, cholera.

4. The sick room and its furniture.

5. The air in the house may frequently contain the inciter of acute exanthema (measles, scarlatina, etc.); less often that of the abdominal typhus, but never that of cholera.

6. The water which had been used in washing or bathing the sick, in washing their linen, and cleaning the sick room.

7. The contents of the water closets as long as they are fresh.

8. The upper layers of the floor, which have received the sputum and ejections of the sick.

9. The convalescent, as well as the dead, body may, under circumstances, cause contagion.

Means of Transmittance.

The transmittance of germs from the carriers of infection to parts of the healthy body, from which it can get infected, takes place:

1. By contact. Persons in good health touch carriers of infection either with the surface of their bodies or with their mucous membrane. Nurses, physicians, clergymen, the family of the sick are most exposed. It frequently happens that these exposed persons, while not falling sick themselves, spread the disease by infecting others in good health by contact.

2. By eating and drinking substances containing germs (typhoid, cholera). Water may be infectious even if not used as a beverage, but if used to clean dishes and glasses. When suspicious, it should, therefore, be previously boiled.

3. By inhalation. The germs contained in the dust of the air may by inhalation enter the nostrils, the mouth, or the lungs, or may be swallowed with the saliva (a frequent means of transmitting the bacilli of tuberculosis).

4. Another means of transmitting these germs of infection are insects. Stinging insects transmit the germ from the patient, or from an infectious source, directly into the blood of the healthy; thus, bedbugs in case of recurrent typhus; mosquitoes in case of malaria; and flies in the case of blood poisoning.

Non-stinging insects play also an important part in transmitting germs, by transferring tiny parts of an infectious source either to the body of the healthy or to his food. These contagious objects are thus embodied in the

organism, concentrated, not diluted by air or water. Hence flies should, as far as possible, be kept out of the sick room of a patient afflicted with an infectious disease, and care should be taken lest such insects descend upon his discharged matter.

For a long time it has been observed that of a number of healthy persons which had come in the same contact with sources of contagion, only part of them fell sick; others remained well, even in continued danger of infection. The former are called predisposed or susceptible for some particular infectious disease; the latter are called immune or unsusceptible. Negroes, for instance, are immune against yellow fever and are less predisposed for malaria than the white race.

Little is known as to the conditions that cause the stated immunity or predisposition.

One kind of immunity is acquired by safely passing through an infectious disease. Conquering an attack from cholera, as a rule—not always—affords protection for months or years against a repetition of the attack. A decided immunity for a long period results after one thorough contagion of the body by pox, scarlet fever, measles, spotted typhus, and typhus of the abdomen.

Basing on this experience, many parents expose their children intentionally to a thorough contagion by measles or scarlet fever, at a time when the named infectious diseases prevail in a mild form. By escaping from the light disease a protection is acquired against possible graver forms of the identical disease.

Immunity against infectious diseases is, furthermore, obtained by vaccination. It affords protection, inasmuch as the body is rendered unsusceptible against the respective infectious disease in its grave form, by having been inoculated with a modified and weak germ of

the disease and passed through the subsequent lighter form of that disease. The widest known example of precautionary inoculation is that by vaccine pox. Vaccine pox have their origin in the transfer of genuine (human) pox to the udder of cows (while milking), or by vaccination of the animals. An English physician, Edward Jenner, made the discovery, in 1796, that persons that had been vaccinated with the contents of vaccine pox were unsusceptible against contagion by the genuine virus. The injection of the genuine virus—a process termed variolation—was, at that time, frequently used to gain an immunity against pox in its graver form, by passing through the injected disease, which generally was milder than one caused by infection. Jenner showed, furthermore, that vaccine pox could be transferred from person to person, and that this humanized vaccine matter afforded the same powerful protection against genuine pox as the animal vaccine matter.

The protective power of inoculation with vaccine matter is certified to by the result of experiments, by Jenner and his contemporaries, on several thousand persons, who were subsequently variolated.

It is, furthermore, proven by exact statistics that during the century reckoned from that date, mortality from pox has been reduced to a minimum in countries where vaccination was made obligatory; whereas, in equally cultured countries, but without compulsory vaccination, the mortality remained stationary.

If vaccination is to benefit the general state of health, it must be made compulsory, else many will shirk vaccination owing to carelessness or prejudice. Compulsion, however, seems only justified if the dangers resulting from vaccination are not considerable enough to overbalance the gained immunity from smallpox.

Experience has shown that heretofore diseased conditions have resulted from vaccination to some extent.

The small wound received by the vaccinated has often led to grave traumatic diseases, especially to erysipelas. Furthermore, it has been found that germs may be transferred from one inoculated person to another by vaccination. Especially was this observed in a number of unfortunate cases where syphilis had been infected in this manner, owing to inattention in vaccinating. That it is possible to transfer tuberculosis in a like manner must also be admitted.

Reckoning with these results of experience, only competent physicians should be permitted to vaccinate, and only with the application of antiseptics. Only the lymph of animals is permissible. Animal lymph is now produced in institutes belonging to the government, and conducted with special precaution. After the lymph is taken from the calf, the animal is slaughtered and thoroughly examined. The vaccine matter taken out is only used if the examination has failed to disclose any traces of tuberculosis or erysipelas. A transport of syphilis is rendered impossible by animal lymph.

A second kind of inoculation on persons, to protect them against infectious disease, is a process invented by Pasteur, of Paris, against hydrophobia. This inoculation is only used on persons bitten by an animal suspected of rabies.

For purposes of this inoculation there is used a dilution of the poison contained in the spinal marrow of rabbits stricken with rabies. An elaborately and carefully made preparation is made from that marrow, small particles of which are dissolved and administered by subcutaneous injections to the person in danger.

In the case of an impending epidemic, the larger ma-

jority of the people can not be assumed to be immune from the threatening disease. Inasmuch as we know of but one preventive inoculation, the vaccination against smallpox, other measures must be taken to prevent an epidemic from spreading.

The simplest preventive is to exclude the sources of infection; but in most cases the task is to keep those already infected from contact with people yet free from infection. The history of all great epidemics, from the pestilence during the Peloponnesian war, described by the eye-witness Thucydides, and from the plagues which devastated the Occidental Empire, under Mark Aurel, and the Oriental Empire, under Justinian, down to the black death of the Middle Ages and the cholera ravages in our days, history teaches that contagion spreads along the tracks of traffic and the highways of commerce.

The cognizance of this fact led to the shutting off of districts where epidemics such as pestilence, cholera, and yellow fever prevailed. This was formerly done by military cordons along the border, and all intercourse with persons and objects was cut off.

For traffic on water similar measures of precaution were taken. In the eleventh century the Venetians, in order to prevent the plague from being imported, quarantined every ship arriving from ports suspected of being infected with the epidemic, for a space of forty days (*quarantina*).

This quarantine is used even to-day as a guard against malignant, contagious diseases. If the danger of infection from ship and her crew is passed, she receives a certificate, with permission to hold intercourse or trade with the city or harbor.

In view of the increased and fast traffic of to-day an examination of the passengers has been instituted at the

terminal stations along the border and at seaports, in order to prevent infection. Every person suspected of a contagious disease is restrained from traveling further, and is placed in a hospital erected for that purpose, where he is put under surveillance and cared for.

If, in spite of all precaution, an epidemic breaks out, every infected should be isolated as far as this is possible. Isolation within the home of the patient being mostly inefficient, his removal to a well-regulated hospital is by far preferable.

Germs of contagion, as reproduced by the sick, are destroyed by appropriate disinfecting. In larger cities private residences, etc., are disinfected by persons especially trained in this important work.

Disinfecting during a case of contagious disease is done as follows:

The discharges of the infected are received in suitable vessels, partly filled with a disinfecting liquid. Soiled linen and bedcloth are put in tubs, in the sick room, saturated with a disinfectant and kept there for some hours. After this they are taken out for further cleansing. If the infected has left the room, his bed, mattress, and clothes are enveloped in a sheet, moistened with a disinfectant and disinfected by steam in a disinfecting apparatus.*

All varnished furniture in the sick room is rubbed well with a dry rag; other objects are cleaned with a liquid disinfectant.

If the wall paper is to be preserved, it is rubbed with slices of newly baked bread, in the direction from ceiling to floor. The crumbs that fall down are swept together and burned. In the same manner all objects of little value coming in contact with the sick are burned up.

* Disinfectors with steaming water are to be found in almost any hospital.

Lime water is spread over the floor. After two hours it is removed by scrubbing with soft soap, dissolved in hot water.

Thereupon the room to be disinfected is fumigated by the burning of sulphur candles; it remains unoccupied for one week and is exposed to the air. After this space of time it can be used again without danger.

For liquid disinfectants are used:

1. Lime water. To obtain the same, one quart of unadulterated, burnt lime, in small pieces, is mixed with four quarts of water in the following manner: About three-quarters of a quart of water is poured into a pail and the pieces of lime added thereto. After the lime becomes dissolved, the rest of the water is poured in and the mixture stirred.

2. Solution of soft soap. One pound of soap is dissolved in seventeen quarts of hot water.

3. A solution of carbolic acid. The proper mixture is held for sale by all drug stores.

Let us illustrate our directions by applying them to the most important infectious diseases.

Tuberculosis.

Tuberculosis (consumption) is, in temperate zones, the most widespread infectious disease, amounting to fifteen per cent. of all causes of death. The original germ of consumption is invariably Koch's bacillus.

Sources of infection are, in the first place, the sputum of consumptives, their soiled laundry and clothes, and the air in the room, infected by sputum. Most dangerous for the surroundings of the consumptive is his use of handkerchiefs to spit in. The sputum dries up easily, is rubbed into particles and ascends with the cotton fibrils of the handkerchief in the air.

The preventive means must begin with the careful removal of the sputum of consumptives. They should only depose their sputum in spittoons filled with water or a solution of carbolic acid. Handkerchiefs, or spittoons filled with sand or ashes, must not be tolerated.

Linen and clothes of deceased consumptives are only to be used after having been most minutely disinfected in the steam apparatus. The sick room must be thoroughly disinfected, especially the bedstead and its contents. Experience shows that germs easily remain and adhere to the bed, whence they mingle with the dust.*

The drinking of raw milk is not advisable, since it is claimed that pulmonary consumption, very frequent in cows, is transmitted by milk to the human system.

Diphtheria.

This ravaging disease of children, up to twelve years, is engendered by Loeffler's bacillus.

Sources of infection are the coughed-up parts of the growths in the throat, the sputum, and the saliva of the sick.

Infection takes place by directly coughing in the face of

*A farmer had within two years three death cases from consumption in his family. After the last case everything that had come in contact with the deceased was disinfected according to the above rules. I ordered the bed straw to be burned, because some of the sputum had repeatedly got into it. However, the straw was not burned, but removed to the stable as a litter for two cows. After four or five months one cow fell away perceptibly, and proved thoroughly phthisical when killed. The second cow, in good condition, was sold to a butcher. Upon killing, two phthisical knots were found to be in the lungs. None of the other organs were infected. The theory that the animals were infected by the bed straw of the consumptive suggests itself.

another person, or by contact of sources of contagion with the mouth of a hitherto healthy person; children, for instance, are prone to put all kinds of things in their mouths and thus easily catch the disease.

Preventive measures consist in thoroughly disinfecting the sputum and all objects which diphtheritic persons put to their mouths, particularly dishes and glasses. When in danger of contagion by having been coughed at, the face must be washed at once with warm soap water; mouth and throat must be rinsed with boric acid water, or, if this is not on hand, with a strong solution of common salt in boiled water.

Cholera (*Asiatic Cholera*).

The home of cholera is the Delta of the Ganges, and Bengal, from whence it is imported into Europe by land or sea. The germ of this murderous plague is the cholera bacillus discovered by Koch in 1883.

The contagious matter is contained in the stool of the diseased, and from there may get on or into other persons and into the most various objects, and be disseminated by them still further.

The transmission of this bacillus occurs through laundry, soiled clothes, food, milk, and other beverages, fruit, vegetables, and fresh cheese.

To prevent the cholera it is mandatory to avoid the intercourse with persons and things coming from places where the disease prevails. In times of cholera one should get accustomed to regular habits, and take pains to avoid indigestion, as the cholera bacillus easily settles in a sick intestinal canal.

It is best to boil the water destined for drinking and household purposes, before it is put to use.

The stool of the patient, likewise his soiled linen and bed clothes, must be disinfected immediately, while yet in the sick room.

Persons who, by reason of their profession, come in touch with cholera infected, must, before leaving the sick room, thoroughly disinfect their hands with a solution of carbolic soap, after previously having washed them thoroughly with soft soap. Not until then can they safely take food or touch their mouth again.

Neither by the air in the sick room, nor by the evaporation of the sick, can cholera be transferred.

Childbed (Puerperal) Fever.

This murderous disease takes away numberless mothers from their families every year. It is prompted by decayed matter (cocchi) coming in contact with the genitals after a recent parturition.

These bacilli stick to the hands, cloth, and instruments of persons who render professional aid to women in labor, as midwives and physicians. To prevent this dangerous disease, midwives must be made to clean their hands with utmost care before lending help to the lying-in. They must be severely enjoined not to treat at the same time women in labor that have fallen sick and others, recently delivered. Beds occupied by women with puerperal fever must be disinfected with utmost care; the bedstead is to be taken apart and washed with a liquid disinfectant.

The large space devoted here to infectious diseases seems justified in view of how important it is to prevent them, particularly as in many cases the clergyman is the first one able to take measures against a further spread of a contagious disease.

It is not our task to furnish a pathological sketch of all human diseases. However, as it must be of interest to the priest, in many grave cases, to know the probable course of a disease, some of the principal symptoms may be stated here, which will enable even the unprofessional to form a rough estimate of the situation.

The general signs which indicate the approaching death of the patient were already described in the chapter on "Death."

Let us now review the symptoms of a few diseases residing in the three big pits of the body.

Apoplexy.

A relatively frequent case of sickness with persons beyond the middle age is apoplexy.

This sickness is caused by an artery bursting in the brain, followed by the effluence of the blood from the cerebrum. The stricken falls suddenly dead if the efflux of the blood has destroyed vital cerebral centres. If the shock is less violent, then consciousness disappears partly or entirely, and there appear signs of paralysis of one portion of the face or of the limbs of one side. The paralysis of limbs is on the side opposite to that where the cerebrum is injured; for instance, in case of a paralyzed right arm or right leg, then the effusion of blood comes from the left side of the brain. Those stricken suffer in some cases from a suspension of speech; the brain is still active, yet they are unable to find the expressions for their thoughts.

Common belief assigns to the third day after the first stroke of apoplexy a particular tendency to bring a repetition of the attack. This is corroborated by pathology, in so far as at that time a reaction begins in the brain by the surrounding parts against the suffered injury,

which may lead to inflammation, more pressure of the blood, and hence to renewed effusions.

Resulting from an apoplectic effusion of blood, or an exudation from cerebral inflammation, or an effusion of blood caused by exterior violence directed against the skull, a crowding of the space within the skull is effected, and the brain is subjected to increased pressure. This pressure manifests itself outwardly by vomiting or by a more or less pronounced stupor, and by a noticeably retarded pulse. The number of beats in cases of grown persons decreases from seventy-two a minute to sixty or fifty a minute.

An acceleration of the pulsation, while the rest of the grave symptoms continue, is a sign *mali ominis,* an indication of the beginning of cerebral paralysis.

Diseases of the Respiratory Organs.

Affections of respiratory organs, which stop the inflow of the indispensable oxygen into the air-cells of the lungs, manifest themselves by the painful breathing of the patient, whose countenance drops, his lips assume a bluish hue, while his forehead is covered with cold, adhesive perspiration. If the obstacle to free breathing (asthma, bronchitis, pneumonia) is not removed at an early stage, then a dire result is to be apprehended.

If pneumonia takes a favorable turn, the dangerous conditions, as a rule, pass away within a few hours, during the so-called crisis. The patient falls into a deep sleep, from which he awakes substantially improved. If this common disease takes an unfavorable turn, then no improvement is manifest after the elapse of a week; the fever continues, rattling in the throat begins, paralysis of the lungs sets in.

Disorders of the Heart.

The various disorders of the heart are betrayed mostly by a panting of the heart, short breath, even in repose, and more pronounced when moving about; sometimes face and lips are of a bluish-red hue; in advanced cases dropsy ensures, the pulse is low and accelerated.

With all serious heart trouble the danger of a sudden death is imminent, particularly so with a disorder of that organ prompted by a calcination of its arteries, causing vehement, oppressing spasms about the heart and the entire thorax (*angina pectoris*). This disease particularly threatens persons with little exercise. Yet workingmen, steadily in motion, have also suffered from a calcination of the arteries, as proved by the dissecting table. Among the working class, however, the graver effects, especially sudden death, occur less frequently.

Abdominal Diseases.

A serious disease of the abdominal pit is presented by the inflammation of the bowels, an inflammation of the membrane of the abdomen and the surface of the viscera.

The symptoms are severe pains, a disposition to vomit, and inflation of the alvine. Pulsation is small, weak, quickened in fatal cases, hardly perceptible to the touch. The body being inflated by gases, the diaphragm can not fall, the lungs in consequence can not expand, and the patient suffers from lack of breath.

It will be perceived from the foregoing that it is quite important for diagnose and prognose to observe the pulse of the sick in a competent manner, a mode of examination particularly favored by physicians of old, while modern

disciples of Aesculapius are only too prone to look on it with contempt.

Accidents.

It is of the greatest importance for the priest to know how to render first aid to the injured. Not only will this knowledge be useful in accidents where he is summoned to administer the sacraments to the stricken, but it will be almost indispensable in the school, where instances calling for immediate aid are not infrequent. We refer our readers to the Third Part of this volume, which contains a very complete chapter on FIRST AID TO THE INJURED.

II.—MENTAL DISEASES.

The term mental disease is applied to deviations from a person's normal mental activity. Their contrast to somatical diseases is conventional rather than essential, for in mental disorders, too, there is one part of the body ill: the brain, the organ of the soul.

This is proven by the results of autopsy on the corpses of monomaniacs; it is taught by a history of the origin of these diseases, and by their symptoms taken all together. The latter especially lead to the deduction that the disease is by no means confined to disturbances of merely psychical functions, but that it indicates morbid changes in the body besides a deviation from mental normality.

Historical Remarks. The recognition of the fact that mental disorder and affected brain are synonyms has been arrived at by observations of nature, by watching the persons afflicted with sickness. For a long time error, cruelty, and superstition ruled supreme in the domain of mental disorders.

The Old Testament already tells us of psychical mor-

bidity. The Holy Scripture tells us of Saul, that the spirit of the Lord had deserted him, that Saul was much disturbed by an evil spirit, and that he found relief, when suffering from attacks of melancholy, in David's playing of the harp.

The book of Daniel narrates of Nabuchodonosor, king of Babylon, how he imagined himself to have been transformed into a beast, how he was turned out by his people, how he devoured grass like cattle.

An example of madness having also been simulated, even in ancient times, is offered by David's pretending to be insane, thereby escaping from the apprehended ire of King Achis. Cunning Ulysses, too, simulated madness, lest he be pressed into service for the Trojan war.

That insanity also took epidemical form is proven by the tale of the Scythes, who, thinking themselves transformed into women, donned the garb and performed the work of women.

In conformity with the view taken in early times of abnormal conditions of mind, the diseased were either worshiped as favorites of the gods, or they were taken to the temples of an idol to be religiously influenced there by priests. In Egypt those suffering from melancholy were sent to the temples devoted to Saturn.

It is only since the advent of Hippocrates that therapeutics for lunatics, as well as for the rest of human diseases, received attention. According to the teachings of Hippocrates, the brains are the seat of mental activity, and are, therefore, like the rest of the organs, subject to natural causes of diseases. Mental disorders have their origin in abnormalities of the brain.

Actaeus (60 B. C.) and Galenus took the same view. The latter already distinguished between a primary cerebral disorder as causing the disease, and a secondary

origin of the latter, due to a morbid state of abdominal organs.

Coelius Aurelianus, a contemporary of Trajan and Hadrian, emphasizes that diseases of the mind are nothing else but cerebral disorders with prevalent psychical symptoms; therefore, they belong in the province of the physician, and not in that of philosophers. His method to cure is precise, correct, free from all coercive measures.

After him an utter decadence of this science must be recorded. The notion that the lunatic be possessed of the devil was, for centuries, everywhere in full play, particularly since such belief was supported by the utterings of these unfortunates. The Middle Ages have produced hardly any other treatises on this subject but on demoniacs.

The numerous trials for witchcraft furnish sufficient evidence of the treatment which real or imaginary lunatics had to undergo in later centuries, when ignorance and superstition were rampant. Such was mostly the lot of *melancholics.* Those *raving mad* were kept fettered in dark dungeons until they perished in filth and misery.

Gentle lunatics were sometimes granted refuge in cloisters.

It is known how in Europe the mischief of trials for witchcraft was combated by the Jesuit von Spee, of Paderborn (died August 7, 1653, at Treves), especially by his book: *Cautio criminalis s. Liber de processu contra sagas.*

Up to the middle of the eighteenth century the lot that fell to lunatics was very sad indeed, although sensible physicians had an idea that the real trouble with these unfortunates was a disordered action of brains and nerves. The fact of these disorders being curable by timely recognition and correct treatment was not then known.

The initiative in reforming and humanizing the treatment of the insane was assumed exclusively by the English and French. Esquirol was the first French clinic to lecture on psychical therapeutics. In Germany the one-sided metaphysical and psychological course taken there by philosophy proved an obstacle to an improvement in psychiatry. A particularly unfavorable influence was exercised in this direction by the doctrines of Kant and the natural philosophy of Schelling.

This one-sided conception of mental disorders was shared by the directing physician in the ward for insane at the Charité at Berlin, Carl Wilhelm Ideler (1795-1860), who, with expert dialectics and ample subtlety, proclaimed them to be nothing else but morbid exuberances of passions. The reaction against this spiritualistic, ethical, and psychological course emanated from the illustrious clinical authority Professor Nasse, of Bonn, a representative of the school of natural science, who, in 1818, founded a periodical for psychological physicians.

Since then the knowledge of mental disorders progressed also in Germany with rapid strides. Well managed institutes for the treatment and care of the insane were established in all parts of the country. The study of psychological therapeutics became compulsory in medical faculties.

Soon the existing institutions proved inadequate for the ever-increasing number of insane persons. It became necessary to found special homes for the care of incurables which could not be intrusted to their families. In this way institutions devoted primarily to the *treatment* and *cure* of insane patients were relieved. In our own United States the care for the insane is excellent.

The increase of mental diseases within the last decades is unmistakable, the growth of certain forms of mental

disorders simply frightful. Special mention among the latter deserve the *general paralysis,* or *palsy, of the brains,* and the *mental disorders originating from drunkenness.* Descendants from progenitors that had suffered from psychical or nervous diseases possess a considerable disposition for mental disorders. The one burdened with that inheritance must not necessarily become diseased, but he may more easily become diseased than a fellow-man not so inclined by heredity.

The reasons which particularly favor an increase of insanity are *social conditions* and the *aggravated struggle for existence.* These conditions begin with mental overwork in youth, and remain a companion to the craftsman or brain-worker for future years, in the shape of privations, struggles and cares, sensuality, dissatisfaction with his circumstances, and other things, of which our fathers knew nothing, or, at least, but little.

It is the aggravated struggle for existence which enters into consideration, particularly in regard to men, as one of the prime causes for one of the most wretched forms of mental disease, the paralysis of the brain or progressive paralysis.

The increase of insanity engendered by *drunkenness* is emphasized by all writers dealing with alcoholism and its effects. The vast importance of the abuse of alcoholic beverages in regard to moral, social, and sanitary conditions will have to be dwelt upon later on. At present only a few expressive figures may be given.

Dr. Garnier, in the January number (1890) of *Annales d'Hygiène Publique,* proves by statistics that within the last fifteen years the number of insanes from alcoholism has doubled. The number of females in Paris whose insanity was caused by alcohol has increased seventy-three per cent. within the past fifteen years. Ac-

cording to the same observer, the cases of paralysis of the brain have also doubled in fifteen years. The women, in this respect too, suffer from this disease to an extent out of all proportion with former times.

As already stated before, an inherited disposition favors particularly the breaking out of a mental disease.

"By far the most important cause of insanity is the transferability of psychopathic disposition, and of cerebral infirmities in general, by way of procreation" (Krafft-Ebing).

Next to tuberculosis there is hardly another domain in the realm of pathology where heredity plays such an important part than in that of psychical maladies. The hereditary burden is most particularly made evident where many intermarriages between blood relatives have taken place, for social or religious reasons.

In circles of nobility, in isolated groups of populace, or in exclusive, religious, communities, like Hebrews, Dissenters, Quakers, the percentage of heredity is larger than in a floating population.

In inquiring after a suspected inherited disposition for insanity, one would go wrong to merely take the parents of the patient in account. On the contrary, the law of *Atavism* prevails here to a large extent. The disposition for sickness can be inherited by the *third* generation from the *first* without the intermediate second evincing any moments of infirmity. The developed disease (innate insanity) is transferred only in rare cases; as a rule only the propitious soil is communicated, upon which psychosis, favored perhaps by additional causes, may shoot up. Thus it happens that individual members of an onerated family escape. It is, therefore, of frequent occurrence to find abnormalities of a mental or nervous nature in the side relations (uncle, aunt) of an insane person.

Furthermore, it must be considered that only in exceptional cases the descendants are stricken with the identical disease from which the ascendants suffered. On the contrary, the law of *transmutation* rules here.

The variability of inherited morbidities sometimes takes the following course: Nervous diseases, as megrim, hysteria, epilepsy, prevailed in the ascendancy; the descendancy develops mental diseases up to idiocy: the gravest form of inherited degeneration.

Another kind of transmutation is shown by the progeny of pathological characters, which almost always are predisposed to insanity. Certain fanatics, cranks, hypochondriacs, queer and eccentric persons, not only have quite frequently ascendant and collateral relatives afflicted with mental and nervous diseases, but also nervous or insane, and even idiotic descendants.

In general it may be said anent the inherited predisposition to nervous and mental diseases, that if two hereditarily onerated individuals join in procreation, or if the unpropitious constitution of one of the generators is aggravated by an exterior or interior inducement, then the burden of the progeny becomes always heavier. Nervous diseases then develop into mental diseases, at first tolerably harmless, which, however, in following generations or in branch sides assume a more and more severe form, till idiocy finally ensues. Then nature amortizes the pathological family, which loses the physiological faculty of procreation.

In this respect the sentence of the Holy Scripture, "I shall avenge the sins of your fathers to the third and fourth generation," has a most earnest significance. To a large extent the way of living, fortunes of life, and selection of partners of the ascendants determine the happiness of future generations.

Next to the organization of his brain, man owes the properties of his psychical being to the *kind and manner of education* received in his youth. At times infirmities in his brain organization cooperate with education in calling forth a disposition to mental morbidities. It is not only by procreation that parents leave to their descendants an afflicted organic constitution. Psychopathically predisposed progenitors, if affected with morbid passions, with vices, or with eccentricities, communicate their oddities and moral failings to their children by bad example, or by giving them a faulty education.

Of corporeal conditions predisposing for mental diseases particular stress is to be laid upon the stages of *puberty* and of the *climacteric.*

It may be of importance to the priest to know the chief symptoms of psychical morbidities, inasmuch as he, in general, is among the first to notice changes in this sphere. Hence let us draw a brief outline of the more important mental morbidities.

One of the momentous symptoms incidental to many forms of mental disease must be mentioned right at the outset: *delusions in the organs of sense,* and such *arising from sensual perceptions,* which occur in mental aberration: namely, hallucinations and illusions.

The difference between the two processes consists therein that in *hallucination* the sensual perception of the patient is not caused by an extraneous irritation of the senses; whereas in *illusion* such an irritation on its way to the organ of apperception becomes perversed.

Hallucination, i. e., the actual apparition of an image of subjective origin, such as sounds, words, impressions of light, bad odors, abnormal sensations of taste, is, therefore, a *sensual deception,* while *illusion* is an *error in discernment of the senses.*

According to the experience of specialists, insanity, in a majority of cases, manifests itself by the *sensitive* part of the mind. There are two distinct morbid conditions of this sensitive part: *melancholy* and *mania.*

In *MELANCHOLY* the principal symptoms are a *doleful mood, dejection of spirits.* It is distinguished from a physiological depression by the absence of any, or of a sufficient, motive. Hence neither the patient nor those around him can explain his morbid state.

Most apparent is the gloom at the beginning of the disease. It manifests itself by ill-humor, dejection, depression, sorrow. The patient complains of oppression, a feeling of pain and anguish of the heart: *precordial anguish.* All outward impressions cause pain to the patient, even those that are relished in normal state: inappetency. Hence he has lost the faculty of enjoying anything; everything appears to him colorless, dismal, hopeless, monotonous; nothing interests him; in short, *all contrasts are wanting in his mind.*

His *imagination,* which only gyrates around *dismal* objects, is likewise hampered. The slow, labored, one-sided thinking process creates a feeling of stupidity, a weak memory, mental barrenness, and gives rise to further painful impressions.

The *will power* is decreased by the gloom, by hampered imagination, by a feeling of a slight bodily fatigue, and by a want of energy; there is an unfounded lack of self-confidence.

Attempting to explain his morbid state, the patient then often recurs to previous sins, perhaps long since atoned for. Self-accusation follows and self-impeachment. He imagines himself forsaken by God; he can not find mercy because of his sin; he is condemned to perdition. Are there corporeal conditions (indigestion, constipation)

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which may serve as an explanation for the depression, then the patient is full of hypochondriac fancies. Out of the feeling of incompetency grows the illusion that his family must perish, that his children will have to starve soon.

Of course, quite an influence is exerted, in developing melancholy, by corporeal conditions and by the different stages of age. Children onerated by inheritance or feeble health fall, at the period of puberty, in a melancholy mood, which is particularly in striking contrast to the otherwise cheerful disposition of their age. Suicides by children find explanation in this morbid condition.

Girls in the stage of development, when away from the parental home, often become homesick, and, in no rare instances, under compulsion of the depression, driven by fancied dismay and coercion, commit incendiary.

The frequent melancholic depression of woman during gravidity or lactation is well known. In aggravated instances she does violence to herself or the infant.

During women's change of life, from the forty-sixth to the fiftieth year, the general psychical tuning down of the system, due to bodily mutations, often causes melancholy to develop.

Persons afflicted with deep melancholia are dangerous to themselves and their fellow beings; they are a *public danger.* If the patient looks for the reason of his morbid condition within himself he is apt to mutilate himself in various cruel ways,* or to refuse food persistently. Because of the self-accusations he com-

* From my own observation I know of a melancholic who, because of *taedium vitae,* and as a result of self-accusations, cut his feet with a dull tree-saw up to the bones, then jumped into a deep well, where he attempted to hang himself with the suspended chain.

mits deeds to impose just punishment upon himself, that he may suffer. To escape from his unpropitious existence, to flee from a base, sinful world, he commits suicide with greatest circumspection, deceiving most cunningly those near him. He is driven to murder his most beloved family because they might fall into need, or because he has the best intention to spare them a life of cares. The patient is still more prone to commit such dire deeds while enwrapped in hallucinations, hearing voices exhorting him to act, reproaching him, etc.

It is altogether incorrect for those around to attempt to divert the patient, to dissuade him from his fancied troubles. He only becomes still more embittered by being contradicted. No one seems to understand him, no one knows the sorrow of his soul. Even the priest, who at the beginning has been molested by the patient in his self-accusation, at confession, even he has lost all influence over the melancholic.

The melancholic must be removed as early as possible from his accustomed surroundings and must be placed in an insane asylum.

MANIA offers a picture of a frame of mind opposite to that of the melancholic—*an unwarranted cheerfulness, an increased and accelerated run of imagination, a heightened aspiration.*

The patient is more active, he carries himself more erect, he talks much and fast, he sings, whistles, and is in the mood for mischievous, inordinate, hasty actions. He produces striking thoughts, acute epigrams, witty remarks and sarcastic comments. A notion of enlarged capability he manifests by praising his health, his strength, his courage, his self-confidence. His condition, as a whole, is like that of one slightly intoxicated, the more so, as his taste for stimulants of all kinds, especi-

ally for alcohol, has been whetted, and because alcohol exercises a more detrimental effect upon his morbid brains than upon the brains of a normal person. The maniac's humor turns often into heated anger if he is contradicted. As long as the patient is master of his temper he avoids conflicts with the outer world. Soon his power of restraint gets lost by dint of his lessened resistance to liquors. By his exaggerated and easily hurt self-esteem, he is driven to rioting, slander, insults, to disturbing the peace, causing damage and injury, and to sexual debauches.

Raving madness is the highest degree of maniacal excitement. The mood is revealed by wild merriment or irate frenzy, by impetus for activity, by ceaseless noise, singing, shouting, by destroying things. His thoughts are chasing one another; they can not be brought to an issue, and become hopelessly entangled. His sexual propensity is increased and manifests itself in disgraceful acts. Mania, when unmixed, is seldom accompanied by hallucinations.

It is self-evident to any layman that patients of this sort must be put in an asylum.

MORBIDITY OF IMAGINATION. Physicians have been of the opinion that any disorder of the mind begins with a morbidity of the seat of affection and they interpreted the deceptive visions as attempted declarations of the changed mood. Recent exact investigation and a thorough observation of the patients, however, have led to the conclusion that it is the imagination that first becomes affected. This disorder of the mind is called primary insanity, madness (paranoia).

The characteristic of the malady is the developing of fancies and visions without a previous alteration of the mood. Cogitation is formally correct; it links the fancied impressions together and develops them. As the patient

can not convince himself that he has altered, but adheres to the opinion that the outer world maintains toward him a different attitude from before, his false relation to the outer world changes consequently his standard as against the world; he is *insane*. Most of such patients are onerated by heredity; already at an early stage they have been possessed of peculiar traits of character, eccentric moods, etc. Any one of the numerous casual causes effects the breaking out of the psychical malady, of which, at first, there are only indications; often the patient dissembles his fancies.

According to the character of the fancies the following distinctions are made:

(*a*) *Imagination of persecution.* The patient imagines his health, his property, his honor, etc., to be threatened. Not perceiving the change in his own mind, the patient conceives the idea some injury to him is being planned; in reading the newspaper he discovers allusions to himself and his family, and insists that some harmless remarks are meant for him. Next in order he shuns people, is irritable, uncommunicative; he complains of being molested by the police, by neighbors, freemasons, socialists. Delusions which appear in the course of his disease tend to confirm his opinion. For he hears the jeers and threats of his pursuers, he smells and tastes poison destined for him in the food, he feels magnetic and electrical operations on his body; ultimately he sees his pursuers before his eyes.

A species of this insanity is that of the litigious. It is characterized by a faulty conception of the law, the inability to perceive being wrong, unmeasured positiveness and egotism.

If their case is dismissed or decided against them, then these persons imagine themselves injured and persecuted.

They resort to never ending demurrers and appeals up to the highest court. The judges are declared corrupt, their decisions rendered in bad faith; all are in conspiracy against them; libels and contempt of court ensue; they are fined or imprisoned, whereupon new litigations arise. They draw up numerous voluminous documents; in court they deliver endless harangues, excelling in repartee and in a faithful memory; they study the code, interpreting the laws according to ideas of their own, become shysters and champions of the "oppressed."

(*b*) *Religious Insanity.* In this form of madness, like the subsequent one, the imaginations of the morbid have the character of *favored connections.* They have an exaggerated notion about their own importance. They are mostly hereditarily onerated, and betray from early youth a "queer" disposition. However, non-onerated persons may also become diseased under the impulse of violent, physically and mentally debilitating forces, especially after religious revivals. At the beginning of the morbidity there appear hallucinations in nearly every sphere of sensual activity. The patient has the sensation of a divine breath permeating his body; a sensation of transfiguration takes hold of him. Women frequently reveal excitement. Sneers and raillery by the surrounders are received by the patient as "trials" to prepare them for the vocation of a Redeemer of the world, of a Prophet. In, by no means rare, cases they attempt to ply their presumed call by reforming and converting, and are quite willing to use force in their missionary attempts. Arrived at this stage, the patient must no longer remain among his usual surroundings, from which he should have been removed sooner.

(*c*) *Insanity with erotic visions.* The patient fancies himself loved by a person in a higher position. His love

to this person is overflowing, romantic, but platonic throughout.

From looks and deportment of that very person the patient gleans that he is not indifferent to her. Advertisements in the newspapers, concerning other people, he believes to emanate from the beloved and to be intended for himself. A communication is soon established by means of frequent hallucinations of hearing and vision, and the intercourse is promoted by illusions. Conversations by others contain for him communications which refer to the presumed love affair. Finally the patient becomes unbearable by his acting according to his fancy. He disturbs the domestic peace, assaults imagined rivals, etc.

(*d*) *Insanity with paralysis* (progressive paralysis of insane, *dementia paralytica*) is a disease of man at his best age. Women are not so often attacked by this disease.

A deterioration of all psychical performances is the forerunner of this malady. Forgetfulness, absentmindedness, laziness, irritability, lack of will power, are noticeable. The altered character is evinced in tastes foreign to his former views. He exhibits a desire for drink, is inclined to be extravagant and to indulge in sexual debauches. Soon corporeal symptoms are added, the patients walk unsteadily, they write a different hand, they are of slow speech, their tongue falters, the expression of the face changes on account of a paralysis of the moving nerves. Blood rushes to the head, followed eventually by apoplectic attacks, which at first, however, quickly disappear, without leaving paralysis of the limbs. Soon arises in the psychical sphere one of the most marked symptoms of this disease:

(*e*) *The delusion of illustriousness.* The delirious notion of grandeur by paralytics differs from a similar

fancy by maniacs therein that in a paralytic brain all spheres of possibility are by far transgressed, all bounds of time and space overleaped. The patient is God, higher than God; he has millions, owns castles of diamonds; he is, all at once, Napoleon, Julius Cæsar, Washington. No reasons are advanced for his fancies. They are not connected, because of the impending psychical infirmity. What the imagined greatness consists of, depends entirely upon the education and social position of the diseased. Finally the patient becomes more and more idiotic, because of progressing disease of the brain. He either succumbs to a stroke of apoplexy, or dies of aseptic blood poisoning, which often sets in if the skin has been made sore by lying.

Having been made acquainted with some morbidities of mental life in the sphere of *feeling* and *thinking,* let us glance at the disorders of the *will* and of the *propensities.*

Physiological life knows but an *impulse* of *self-preservation* and a *sexual impulse.* Morbid life does not create new impulses, as formerly falsely assumed. The doctrine of morbid impulses culled by psychiatry from French works defied all laws of morality and of society. If a person under somewhat striking circumstances committed a crime against life or property of his fellow-beings, then, according to that doctrine of monomania, he was not to be impeached for the deed; he was suffering from a morbid impetus to a criminal act, for which he could not find any restraint in his powers. The following morbid impetuses were fixed: To steal, *kleptomania;* to lust, *aidoiomania;* to suicide, *monomaniacal suicide;* to murder, *monomaniacal homicide.*

A morbidity in psychical life can only *decrease, increase,* or *pervert* already existing natural impulses.

Anomalies of the appetite. An *increase* of this impulse

can be caused by bulimia, a voracious appetite, which appears shortly after meals and alternates with inappetency. This morbidity is found in hysterics and maniacs. It is different from the want of feeling of satiety common with idiots, which leads to overloading the stomach.

A decrease of appetite is found with melancholics, hypochondriacs, hysterics. Maniacs often refuse to take food, because of some fancy, for instance, not being worthy to partake of food, because they are sinners, or because they can not pay for it, have no longer a body, because stomach and guts are constipated, because they are dead, or have putrefied intestines. Or they suffer from hallucinations. Voices command them to fast, or the food tastes like poison, like having been polluted.

The perversions of appetite occur, as it is known, also in some corporeal morbidities, where the psychical life remains intact. So the desire of anaemic girls to stealthily eat lime, salt, sand; the preference of the hysterical for offensively smelling and tasting substances, like valerian, asafetida; the hankering of pregnant women after most peculiar things to eat; and other aberrations of taste. A revolting perversion of this propensity in grave psychical disorders is the coprophagy, the impulse to eat their own excrements.

Anent the anomalies of the sexual impulse it suffice here to remark that with neuropathic, hereditarily predisposed persons the sexual impulse manifests itself at an abnormally early age, leading to sexual excesses. More important for the priest, as teacher of morals and as psychologist, are the *perversions* of the sexual impulse, since he must there distinguish *between morbidity and moral depravity.*

Any act of sexual gratification contrary to the intention of nature, to propagation, must be declared perverse.

It is to be noted that not every perverse sexual act is a morbid one. From the pool of moral depravity spring the sexual aberration of profligates, widely spread in the days of the ancient Greeks and Romans, and to be met with even in our days. For obvious reasons this is not the place to further discuss this particular chapter.

The free exercise of the will is interfered with by any form of mental disorder. Christian morality and the criminal codes of all civilized nations acknowledge this fact.

Free exercise of the will in one insane is impossible:

1. Because in consequence of the morbid alteration of the brain, the organ of the soul, there arise impulses to deeds which fail to be restrained by moral and ethical countermotives, lacking by reason of that very morbidity.

2. Because the consciousness of the ego and the perception of the outer world have been displaced by deceptive fancies and hallucinations Although the punishable deed has been committed by that very person under jurisdiction, he was psychologically an entirely different being.

Nervous Disorders.

Let us now turn to two *nervous* diseases, which as such can exist by themselves, but which also frequently cause a psychical disorder to root on their soil and which are encountered many times by the priest in everyday life. They are *epilepsy* and *hysteria.*

EPILEPSY. Epilepsy is a chronic disease which in its developed form consists in frequent attacks from general spasms, with complete suspension of sensation and of consciousness, and lasting from a few seconds to some minutes.

These spasms are, in many instances, preceded by warn-

ings. The patients feel a pricking or a twinge in leg or arm, or a pressure rising to their head. The epileptic, sometimes with a piercing cry, falls to the ground, losing sensation and consciousness.

During the first moments after the fall the patient's muscles are rigidly contracted. The breath is drawn in, the eyes are wide open, arms and legs stretched and straight. After a few minutes this rigidity ceases, and is superseded by violent convulsions of all muscles. Respiration is blocked by the cramp of the thoracic muscles employed in breathing. Hence the face assumes a bluish hue, becomes swollen. The agitation of the lingual muscles forces the saliva out, which escapes in bubbles. Frequently it is mixed with blood, the epileptic having bitten his tongue.

During the fit it is necessary to guard the patients against injuring themselves; especially must their faces be kept from falling into liquids, as they may thus be easily asphyxiated.

In case of attacks recurring for years, there develops a certain grade of dullness, which in grave cases may degenerate into idiocy. In most patients the so-called epileptic alteration of character can be noticed in the intervals between fits. It is an abnormal irascibility, a peevish mood, which fluctuates with increased capriciousness between psychical depression and exaltation. To this undulating mood corresponds a pathological religiousness. They are religiously either exalted without any reason, or abnormally contrite. Many epileptics evince a tendency to sanctimony and asceticism, which offers a striking contrast to their usual fretfulness and incompatibility. These traits are especially noticeable in asylums. It is only in rare cases that the mental faculties are left entirely intact by epilepsy.

The classical attacks, indicated by general spasms, may be substituted in epilepsy by equivalent *nervous attacks* which at first sight have nothing in common with the falling sickness. Such psychical equivalents are:

1. *Conditions of unconsciousness,* lasting frequently for a few seconds only. The patient suddenly interrupts his speech; if walking, he stops; he drops anything held previously in his hand. If this morbid attack continues for some time, the patient commits acts in violation of common sense, of morals, and of laws. Such mental absence either follows epileptic fits, or initiates them, or the whole attack consists merely of a short suspension of consciousness.

2. *Greater disturbances of consciousness,* accompanied by awful visions (blood, fire, etc.); these follow at times grave attacks (postepilectic madness), and end in sleep, with a subsequent recovery of consciousness without any recollection of what has happened.

While in that delirious state the epileptics are likely to commit the most violent assaults upon other persons.

3. *Epileptic vertigo.* The invasion is by light convulsions. The head is swimming, objects appear suddenly to circle about the patient, consciousness is only suspended for the briefest time, hardly noticeable. The patient himself declares after a few seconds, "It's over."

It is self-evident that the deplorable epileptics are not only ill at the time when visited from an attack of their grave malady, but that there prevails an enduring morbid condition of the brain, the attack or its equivalents representing merely a temporary discharge. On account of the continuous morbidity, the removal of these patients into an asylum is opportune if they fail to be attended at home with expert care. Many patients, whose condition at home is pitiable, improve when cared for in

an asylum. The attacks can be made milder, the incidental danger for the patient is minimized by the watchfulness of the nurses. His spirits are revived. His depression gives room to confidence if he perceives how he can find an occupation and be useful notwithstanding his sickness; whereas this was impossible for him while at home.

HYSTERIA. This term applies to a nervous disease marked by an abnormal irritability in those nervous spheres which bring about sensation and motion, but which also and particularly appears in the psychical domain, when no evidence can be found of anatomical changes in the central organ of the nervous system, brain and spinal marrow.

The word hysteria indicates the assumption in former times that the disease was confined to the female sex and that it initiated from the sexual organs. Both assumptions are erroneous. Neurotic hysteria is also a disease of men, although, by far, more seldom than of women.

The fact that hysteria is frequent in women who suffer of a disease of the sexual organs only indicates that this is one of the ways in which like disturbances of the nervous system may arise.

The abnormally increased irritability of the sexual nerves is characterized by various sensations of pain. Their peculiarities are a steady change in the seat, extent and duration of the pain, want of a traceable original cause, a sudden disappearance of pain or its leap to other nervous spheres previously unaffected.

In place of an *oversensitiveness*, an *insensibility* of single corporeal regions has been observed in grave cases. Of perverse sensations peculiar to hysteria may be mentioned *clavis hystericus:* the sensation of a nail piercing the brain; *globus hystericus:* the sensation of a ball taking its course from the heart to the larynx and causing

oppression. The nerves of the organs of senses are likewise at times in an oversensitive condition. The eye is painfully affected by the ordinary irritation of the sunlight. Noises which never molest a normal ear are unbearable to hystericals. Odors, not disagreeable to others, greatly annoy these patients, whereas smells which are not pleasing to most persons, for instance, the odor from burning feathers, of the valerian weed, etc., agree with them.

In the nervous realm of motions convulsions and cramps take place in hysterical persons. Even complete spasmodic attacks, as in epilepsy, may occur, preceded at times by shrieking, howling, barking, laughing, or crying. During these spasms consciousness is mostly not altogether suspended. After the attack has run its course the patients soon recover entirely without being the worse. These attacks occur only when the hysterical is awake, in daytime, never at night, in contrast to *epilepsia nocturna.* Just as oversensitiveness in some cases is replaced by insensibility, so we meet here, besides a heightened irritability expressed by convulsions and by cramps, with a *paralysis* of single groups of muscles. Even the whole body is sometimes in a state approaching paralysis, which prompts many hystericals to remain in bed for months and to scrupulously avoid any exercise.

Of greater import than the physical condition of hysterics is to the clergyman their psychical mood. Hysterical people are not only a *crux medicorum,* but are tormentors of the priest, in and out of the confessional.

Affections are called forth with ease. The patients are easily frightened, easily overwhelmed by everything unexpected, sensitive to pain and easily offended. Any trifle puts them out of humor and causes excitement, never ending until some new irritation occurs, which is

apt to call forth the opposite mood, and just as strong as the previous one.

The dismal mood, during which the patients are annoyed and pained by everything, and feel unhappy and incompetent for anything, may be followed immediately by a most cheerful, often also playful and mischievous humor, wherein they see everything in a roseate hue and are often capable of performing astonishing feats. The whimsical temper is the proverbial trait of hystericals. It manifests itself in a perpetual attempting and abandoning, in spasmodic, hasty actions without enduring energy.

At the same time the patient endeavors to impress her people with the idea that her condition be something utterly pitiable, grand and extraordinary, her heated imagination often violating the truth. The border line between this abnormal psychical conduct and a genuine mental disease can hardly be drawn. The degree of psychical change is less decisive in this respect than the duration of the morbid psychical symptoms. Only after enduring alterations of the imaginative activity have developed, accompanied by hallucinations, only then is it a case of hysterical *mental* disorder.

The objects of the fancies by morbid hysterical changes according to the intelligence of the patient. Frequently the object is a religious one—the patients see the gates of heaven opened, have divine apparitions, have intercourse with saints, they hear and proclaim all sorts of prophecies, with or without sense.

The attacks of demonism, which have played a prominent part particularly in the hysterical epidemics of former centuries, and which yet occur even to-day, have their roots likewise in religious fancies. The patients believe to house the devil, or various evil spirits, within their body, to be driven by them to contortion and

paroxysm, and to be compelled to utter unholy, shameful remarks, speaking for the unclean spirits and against their own volition. Many vary even the pitch of voice, according to whether one or the other evil spirit compels them to speak. An erotic trait is seldom missed in those cases. It is most undisguised in cases where delirious patients imagine to have been abused by persons about them. The details are often told with such vividness, and deviate so little from the possible, that at various times such charges have led to trials, and, in some instances, to convictions.

In touching upon a few prime causes of hysteria, we meet, like in all nervous morbidities in a wider sense, as most important cause the *hereditary oneration.* Particularly occurs here immediate communication in this manner. Hysteria of parents, or ancestors in general, results in hysteria of the children. Especially the communication of this sickness from the mother to the daughter occurs extraordinarily often.

The most essential influence upon both, the suppression and the development of hysterical predisposition, is exercised by *education.*

It is possible by a fitting influence upon body and mind to smother the existing predisposition to hysteria; but also, vice versa, a non-existing predisposition, or one in a slight degree, may be developed artificially. All influences favoring corporeal feebleness operate in the latter respect; therefore, a too effeminate education, whereby the body does not obtain the necessary degree of resistance, is just as detrimental as one too strenuous, which exacts efforts beyond capability. Both extremes are also detrimental in moral respects.

By too much yielding a lack of will and a capriciousness are favored, which furnish auspicious conditions for

the appearance of hysteria. Too much severity and intimidation are apt to call forth so violent an agitation that it causes increased irritability of the entire nervous system, paired with weakness of character, a result which promotes the disease. The greatest danger, however, lies in an unsteady, whimsical education, wherein immoderately now one, now the other course is pursued.

Particularly dangerous are excessive demands from the mental capability, the overburdening with objects of instruction and inciting ambition at the same time. Want of sufficient exercise is, as a rule, another inciter.

The influence of a faulty education on the development of hysteria can not be appreciated thoroughly without taking account of a cooperating lesser circumstance, which is found, even at a higher age, to be one of the causes of hysteria—the stimulation of the impulse of imitation. Hysterical mothers not only communicate the germ of the disease to their children, they also favor its development by the education they give and by their *example*. First of all the symptoms of these attacks, especially paroxysm, incite imitation.* But even the entire way of feeling and of thinking is communicated with continued intercourse. This so-called *imitative infection* is found to operate at times on nurses, having attended hysterical patients for a long time, in a similar way as it does upon children. Also other patients, having been in the same room with hystericals, or casual witnesses of hysterical paroxysms, become frequently infected.

* Professor Hirt, of Breslau, reports that in a village school of Silesia there were twenty girls out of a total of thirty-eight who became ill with hysterical spasms. Professor Hirt positively declares that the spreading of the morbidity among these children was caused by the impulse to imitate.

This imitative infection has no small bearing upon the spread of hysteria in public and boarding schools. It has been a matter of observation that, after the first case of spasms in the presence of other pupils, there soon ensued several similar cases in girls previously healthy.

III.—Diseases Due to Certain Occupations. Safety Devices for Workingmen. Social Legislation

A group of diseases is caused by the nature of a man's calling, the daily occupation, as is particularly the case with workingmen. In the majority of cases the disease is caused by the *material handled,* for instance, mercury in plate glass factories, phosphorus in match factories, lead in making lead paints, etc.

But also non-poisonous materials are apt to cause diseases if they pulverize too much in the course of their handling. The dust particles of the working material are absorbed by the lungs and incite certain morbid changes of that organ, which are termed *dust inhalations.*

Not only dust particles of the working material are inhaled, also different gases which develop in many industrial processes. Diseases from gas inhalation form another class of such diseases. Furthermore, many diseases of workingmen are caused by physical overexertion, be it that the work itself taxes the muscles too much, be it that the body is not developed sufficiently, or strong enough, to perform a certain work (children and women). In some trades certain organs of the body or certain

groups of muscles must be particularly exerted, and, therefore, are more exposed to injury. A fixed *attitude* of the body *long maintained* during work leads finally likewise to disease.

I assume that this class of diseases is of interest to the priest because his vocation brings him quite often in touch with the industrial workman. This intercourse seems to make it desirable for the clergyman to obtain a general outline of the dangers threatening the health of his parishioners.

It is self-evident that the handling of poisonous materials in the course of his work must entail grave dangers for the workingman's health. The doors by which these poisonous substances enter the system are lungs, stomach, and skin of the workingman.

The handling of *mercury* entails many dangers to health, both at the place where it is produced: at the quicksilver mines, and in the different manufactories where it is used, in silvering mirrors, in hat factories, etc. Ulcers in mouth and throat, convulsions, and finally general cachexy appear if the workingman relaxes in his caution. Therefore, the workingman must be in perfect health before starting work, and must be constantly on his guard during work.

Preventive measures are embodied in detail in factory rules. They relate to the workshop and the clothes of the men at work. In rooms where mirrors are silvered, special clothes must be worn. Every workingman must wash himself carefully before and after work and rinse his mouth with a prescribed solution. Meals must be taken in a different room. A workingman must not be employed in the dangerous silvering room longer than four hours a day and not oftener than three times a week.

The trade wherein chiefly the poisonous *phosphorus* is used are the match factories. The handling of phos-

phorus in this industry entails many dangers for the workingman's health. The disease which workingmen in match factories chiefly acquire is an affection of the jaw-bones, which leads to sores and to the decay of the bones. Persons with bad teeth are particularly in danger. In view of the incidental danger this industry, at its beginning, was forbidden in some countries. Only gradually sanitary measures preventing injury became known.

Another most poisonous metal for the handling worker is *lead*. It is variously used, for glazing in potteries, for paints, etc.

The most widely known disease of persons working with lead-containing matter is *lead colic*. It consists of attacks of vehement gripings in the bowels, especially about the navel, and persistent constipation.

At a higher degree of lead poisoning there appear pains in the joints similar to rheumatic aches, without, however, changing their seats. Next paralysis sets in and atrophy of muscles, in the highest grades even deliriousness, mental depression, and epileptic spasms.

The sanitary rules in lead works, and in shops where lead is handled, should be very stringent. Especially the raising of dust in the shop, or at the machines which crush the lead-containing material, is severely to be guarded against. Youthful workingmen are to be excluded from employment or from staying in works where lead paints or white lead are manufactured.

Aniline factories which use *arsenic* are dangerous both for the workingmen and for the neighborhood, arsenic being one of the strongest mineral poisons, as is well known.

Among the kinds of *dust* inhaled with the air in the shop by workingmen, *coal dust* occupies first place beyond all doubt. A deposit of coal dust in the lungs—*anthra-*

cosis pulmonum—is met everywhere where the lungs are compelled to breathe smoke and coal dust with the air. This is the case in the air laden with tobacco smoke in crowded saloons, in collieries and mines. The inhaled dust incites the respiratory organs to frequent coughing in order to get rid of the foreign substances. Therefore, we frequently meet miners afflicted with cough and mucus.

A prolonged inhaling of coal dust seldom fails to produce short-windedness in a considerable degree, caused by chronic inflammation in the lungs. The pale color of many coal dust inhaling workingmen is not only caused by the lack of oxygen in the working place (for instance, in coal mines), but also by the deposited dust contracting the capillary vessels in the delicate pulmonary tissue, and thus rendering them unfit for inhaling or expelling air.

On the other hand, all observers emphasize the fact that genuine pneumonia is a rare disease among workers who inhale coal dust. Therefore, there is a tendency to ascribe to coal dust a specific operation against tuberculosis and pneumonia.

Regarding the various kinds of coal dust and the trades in which they are inhaled by workingmen, there work in an atmosphere containing the dust of the *charcoal,* the charcoal burners, the coal dealers, the firemen, and the workingmen in ultramarine and powder factories. *Anthracite coal dust* is inhaled by miners, trimmers, firemen; *soot* by chimney sweepers and miners; *graphite* by smelters and molders. According to investigations by Hirt and Lewin, of all coal-inhaling trades it is among the chimney sweepers where the best health conditions prevail.

Another kind of dust inhaled by some industrial workingmen is *iron dust.* Its deposit in the lungs is termed

siderosis pulmonum. The symptoms perceived in these workingmen resemble partly those found in coal workers. On the other hand the effects of metal dust are far more destroying for the pulmonaric tissue than coal dust. The number of consumptives in these trades is extraordinarily large.

Of trades where metal dust is breathed are next in order the factories which prepare the peculiar paper used for the reception of gold leaf. Peroxid of iron is rubbed into this paper with a piece of dry felt, whereby an enormous amount of dust is raised. "The vitality of the girls employed at this trade," says Merkel, "is so low that it is only astonishing why not more of them perish and why, again and again, girls are found who heedlessly brave the very same danger."

Particularly detrimental to the lungs of the worker is the dust developed in grinding steel wares. It is a mixture of iron and sandstone. This most noxious species of dust is raised in grinding scissors, knives, forks, pens and needles on fast rotating grindstones, with 2000 to 3000 revolutions in one minute.

No less detrimental to the lungs of the workers is the influence of *stone dust,* particularly of *quartz,* as its smallest particles are extraordinarily hard, splintery, pointed, hence hurting in the highest degree.

Two classes are especially exposed to this kind of dust: the workmen in the *pounding mills of glass factories,* where the raw material for manufacturing glass is crushed to a dry powder, and the millwrights, who grit the millstones. The age average of these workers does not even reach that of the English needlemakers—thirty-five years.

Nor do workingmen exposed to *tobacco dust* present any favorable conditions of health. The likely cause is not only the dust inhaled, but other competing noxious

influences: the sitting attitude, want of fresh air, premature and excessive smoking in leisure hours, and lastly, the fact that frequently workingmen of feeble health look for employment in cigar and tobacco factories. These unsanitary conditions prevail, to a greater extent, where tobacco is worked up as a home industry. Then the workroom is often used as dwelling-room for the family, and as kitchen. The atmosphere therein is hardly breathable if the lungs are not accustomed to it.

Among the poisonous gases inhaled by the industrial workingmen when at work claims our attention the *carbonic* gas, in everyday life called merely gas. It has been dealt with in the first part of this work. The natural and most important symptoms of poisoning by carbonic gas are affections of the brain. They start in with a dull headache; then the eyes grow dim, dizziness sets in, followed soon by a total and long unconsciousness. Has the poisonous gas been inhaled for some time, then the poisoned expires without having regained consciousness.

To the danger of breathing carbonic gas are exposed the workers in gas plants, on conduits, and those employed at blast and coke furnaces.

Closely related to carbonic gas is *carbonic acid,* both in regard to its chemical composition and in regard to its operation on the human organism. Gaseous carbonic acid, or the mixture of gases wherein it is prevalently contained, develops during fermentation, in distilling liquors, in breweries, in the fermentation of wine. The deadly gas mixtures in old tombs or in wells that have been closed for a long time contain a preponderance of carbonic acid besides small quantities of sulphuretted hydrogen. Exposed to the danger of inhaling the last named poisonous gas are the workmen in sewers and canals and the tanners. The poisoning, as a rule, appears suddenly,

as that from gas in wells. The worker collapses as if struck by lightning, and he will be past rescue if not removed at once from the operation of the poisonous gases.

It is quite natural to expect a particular benefit in all unsanitary occupations from preventive measures. But prejudice and ignorance, heedlessness and lack of knowledge, want and poverty are competing with lack of conscience and with greediness, to render *prevention* here as difficult as possible.

As there will be little success from the instruction of either workingmen or employers in regard to the prevention of diseases, we must arrive at the conclusion that it is necessary for the government to frame general rules for the sanitary safety of the worker, and that the fulfilment of these laws should be supervised by government officials.

This demand for the workingmen's safety by legal provision has been complied with more or less by all civilized governments. England, in this respect, is ahead of them all. Next to that country, Switzerland has enacted the most satisfactory factory laws.

IV.—Hypnosis and Suggestion.

By hypnosis* is understood a sleep-like state of the nervous system, at which a person arrives through the agency of another person, the hypnotizer. The hypnotizer's method with the susceptible person—medium—consists either of the command to stare at a glittering object, a glass button, for instance, or of passes with his hands over the medium's forehead and extremities, or even in the hypnotizer's simple command, "You are tired; close your eyes. Now you're sleeping."

*ὕπνος, sleep.

The hypnotized, upon entrance of hypnosis, continues in the attitude last assumed before falling asleep. He is like a statue. His senses are suspended, barring the hearing. Upon the hypnotizer's proposing (suggestion) any part of the central nervous system may be set in action and any psychical act made possible. The automatic mechanical performance ceases as soon as the suggested order has been executed. The retransfer from the hypnotic into the lucid state is easily accomplished by the hypnotizer, either by breathing at the medium or by the mere command to wake up. Upon awakening the hypnotized has no recollection of what has occurred during his hypnosis. Commands by the hypnotizer may continue their effect upon the awakened, e. g., to move a limb that had been previously stiff, that it be no longer paralyzed; not to feel pain in a certain part of the body which had ached before. As a matter of course, this applies exclusively to such state of paralysis not due to any anatomically traceable lesion of the nerves, for instance, to *hysterical* paralysis. No hypnotizer would have the power to revoke by suggestion the paralysis due to a stroke of apoplexy.

To the extent of the observations mentioned, hypnosis is employed as a remedy. It was this striking condition of the nervous system whereby one person becomes the helpless tool of another, which raised, some twenty-five years ago, a storm of excitement in Austria and Germany on occasion of the exhibitions by the noted hypnotizer Hansen. A stream of believing and unbelieving, of educated and ignorant, persons poured forth every night to witness the performance. The programme of the show was always one and the same. Hansen invited to the platform a number of the spectators willing to be experimented with, placed them on chairs, their backs turned to

the audience, and handed a glass button to each. Each one was told to fix his eyes, and stare immovably, at the button raised close to the forehead. Hansen himself went from one object to the other, making a few strokes and passes in front of each face. Within five or ten minutes one or the other among the objects fell into a hypnotic state. The muscles of the object became so rigid that it was possible to place his head on one chair, his heels on another, keeping the rigid body thus suspended. A few passes by the hypnotizer's hand removed the rigor of the muscles—the medium woke up.

Another hypnotized object was handed a potato, and was told it was an apple. To the great amusement of the audience the object ate the raw potato with perceptible relish. It would be beyond our scope to dilate upon every number on the programme of a kindred exhibition. First of all, it should be pointed out that Hansen brought nothing new to the surface. His manipulations rest on observations gleaned, in part, from the practices of uncivilized nations.

In order to create a proper susceptibility of nervous activity by concentrating the entire attention on *one* object, Hansen made use of a glass button.

The Yogies in India provoke an ecstatic condition by Trâtaka, i. e., by gazing upwards, the priests of the Viti Islanders by fixing their eyes silently and calmly on an ornament made of fish teeth; after an elapse of a few minutes, they begin to convulse and to tremble; they mumble and groan—the spirit is supposed to possess them; in full paroxysm, with rolling eyes bulging out, with pale and contorted features, the hierophant proclaims the revelations received, in a loathsome voice. In similar fashion are inspired the oracles of spirits on Sandwich Islands, Tahiti, and other isles in the Pacific Ocean.

Apparitions quite similar to those produced by Hansen were called forth by Mesmer toward the end of the eighteenth century with the aid of big so-called magnetic bathtubs, by passes, etc. Mesmer ascribed his successes to his discovery of a mysterious fluid, the so-called animal magnetism, or magnetism of life. Existing as moving agency everywhere in space, this fluid was thought to be communicated as a healing power from the magnetizer to the object, through the appliances mentioned. This novel theory, clothed with much unsound mysticism, gained ground rapidly, but also was vehemently antagonized in medical academies and societies, which sharply condemned, time and again, Mesmer's conduct.

Dr. James Braid, of Manchester, in 1841, propounded an entirely novel theory of animal magnetism, whereby he became the real discoverer of hypnotism. Braid proved by his experiments that the magnetizer does not communicate to the object a mysterious force which emanates from himself, but that the object by himself can assume a strange sleep-like, sometimes somnambulic, state wherein he thinks to have a distinct sensation not only of spontaneously occurring presentations, but also of those which were called forth—suggested—by the hypnotizer. This condition, produced by staring at an object, is really due to qualities and faculties innate to his nervous system. Braid's discoveries gave rise to all sorts of erroneous and barren speculations, as was the case with Mesmer's findings. Again and again the facts of hypnotism were overhung with certain mystic accessories born by superstition and humbug.

In his work "*Du someil et des ćtats analogues,*" Liébault, of Nancy, furnished the proof that the strange sleep-like condition, termed hypnosis, is not called forth by a mechanical-physical process, like the tiring of the

eyes from staring, or by the soothing effect of a gentle stroke upon the nerves of the skin, or similar manipulations, but only and solely by the idea produced in the medium that it must sleep; furthermore, that all other seemingly natural effects of hypnosis, as the rigor of muscles or the insensibility of the skin, are caused solely *by suggestion,* which the one experimenting, expressly or implied, communicates to the object. Where no direct words are uttered in *suggesting,* then the object guesses from certain circumstances or hints, or from previous experiences, what the hypnotizer expects. If, for instance, he lifts the medium's arm, it will in most cases fall down again. If, however, the arm is lifted a second time, then the medium rightly assumes that the hypnotizer desires the arm to remain in the given position. Suggestion, whether communicated directly or indirectly, is the kernel and the hinge of all effects caused by hypnosis, and hypnotism itself is nothing else but a condition of enhanced suggestibility, caused by suggestion.

To employ hypnotism, respectively suggestion, for medical purposes, should only be allowed to an expert physician who conscientiously takes all corporeal and mental conditions of the patient into account.

It is evident that such a variation of a person's nervous life at the hands of impostor, or an ignoramus, may cause great injury, personal and general. This applies especially to public experiments and shows. The persons used as objects in such demonstrations are impaired in their corporeal and mental health by negligent, unsuitable, careless and too frequent hypnotizing. An authority on the matter remarked in a discourse on origin and cure of hypnotic diseases: "The state of hypnosis consists in an expressly provoked loosening, even in partly unfastening, the normally fast ties between psychical and

corporeal events. But if loosened once, or even frequently, this tie undoubtedly loses its enduring security, hence persons repeatedly hypnotized are in danger that similar conditions may occur for some reasons not contemplated or foreseen by the hypnotizer. The very state of hypnosis must unconditionally be looked upon as something abnormal, something morbid. Exactly the same symptoms, as expressly provoked in hypnotizing, are known to the physician as primary symptoms, by no means rare, of morbid conditions, caused naturally by a mental disorder, which he terms hysteria. Hypnotic conditions and symptoms of hysteria in their inner nature are most closely related. Hypnosis is nothing else but an artificially provoked hysteria. . . . Hypnotism remains ever a double-edged sword, which can do much harm, especially if not altogether judiciously used. This has been shown by experience time and again."

The sense for decency and propriety disappears by public exhibitions, or becomes, at least, greatly impaired. Those present during the experiments run the risk of acquiring morbid nervous conditions, by looking at the mediums who lend themselves for these demonstrations.

De La Tourette reports that after the public exhibition by the Magnetizer Donato, in the winter of 1880-1881, in French Switzerland, a real magnetic epidemic, "magnetism mania," made its appearance. The very same was noticed in Breslau after Hansen's séances, especially among young people. At the fifty-third convention of German scientists and physicians, at Danzig, 1880, the case of an artillery officer was related who was so susceptible that he could not attend a séance without running the risk of becoming hypnotized.

As a result of these consequences public exhibitions of hypnotizers are prohibited in many countries.

The fact, finally, that while in hypnotic state a person may be exposed to assaults should not be overlooked.

Attention has furthermore been directed to alleged criminal possibilities of hypnotism, which are quite fallacious. This, furthermore, is equally the case with another excrescence which has shot up on French soil. Since these criminal possibilities will be of interest to the priest in the confessional, we shall here devote some attention to them.

The French physicians Bernheim and Liégois asserted that a hypnotized person can be commanded by suggestion to commit a crime, and that upon awakening from the hypnotic state the person in question can not help committing the ordered deed. Hence that person can evidently not be charged with the crime, neither by the criminal judge nor by his own conscience.

These and kindred views of men who had made of hypnotism a particular study, incited, when first published, a widespread dispute, and disturbed the peace of the minds to a large extent. Searching investigation and unbiased weighing of the alleged facts, however, soon disclosed that the originators of these views were enmeshed in the most flagrant contradictions, and that they were unable to produce even a single attested case from real life to support their " laboratory theory," if it is permissible to use this term.

At the sixty-first Congress of German Physicians, at Cologne, this heresy of Bernheim was refuted as " in no ways borne out by fact, and belonging to the realm of visions." Bernheim's teachings—in which he sees the effects of suggestion everywhere: all our thoughts, deeds, and actions are suggested—were even refuted by his own fellow-countryman, Dr. Gilles de la Tourette.

In concluding, suggestion incites also our interest inasmuch as it was brought forward as an explanation for

many extraordinary cures, which occurred at places of pilgrimage, for instance, at Lourdes. The above mentioned student of hypnotic conditions, Professor Bernheim, of Nancy, who, of course, is prone to trace back all psychical processes to suggestion, has this to say anent the miraculous cures at Lourdes: "It is not my intention to attack religion or to hurt the feelings of the faithful in examining these credible reports of cures at Lourdes and in trying to disrobe them in the name of science of their character of miracle. My object in view is merely to bring about a comparison between *religious suggestion* and *hypnotic suggestion.*

"There is no doubt that all these reports were collected in a spirit of truth and were tested by honorable men. The facts are correct; their explanation may have been erroneous."

Charcot, one of the most famous French neurologists, every year sent many of his patients to the spring of grace. According to an article in "*Archives de Neurologie,*" he had no doubt that even wounds, sores, cancer, etc., can be cured at those places of pilgrimage; but he believes that these processes are founded on hysteria, and that the morbid symptoms may appear and disappear upon suggestion. But, finally, he honestly admits that even to-day there are many things on earth which can not be explained by our philosophy. Leaving out entirely the morbidities of the nervous system, it is not difficult for the unbiased observer, who has been at the sick bed and the dissecting table, to decide the question where the greatest sacrifice of intellect comes in: if he is to assume a cancer, a caries, a fungus, has been made to come and go by suggestion, or that it has been cured by a miracle.

Reviewing the above, we arrive at the following conclusions:

1. The striking mutation of the nervous system, termed hypnosis, rests on natural proceedings and lacks all those mystic-spiritistical trimmings, with which the representatives of animal magnetism (mesmerism, braidism) tried to clothe it.

2. The exhibition in public of hypnotic experiments on persons is decidedly to be prohibited, for the sake of morality and public health.

3. Hypnotizing for the purpose of effecting cures should only be permitted to expert physicians.

4. Hypnotic state exposes persons to the danger of assaults.

5. The doctrine, propagated in some quarters, that suggestion abolishes the free agency of a person, inasmuch as an irresistible impulse to a deed, especially a crime, may be suggested to the hypnotized, is erroneous.

6. While suggestion may play a part in allaying morbid conditions, as an explanation of miraculous cures it is entirely inadequate.

V.—Alcoholism.

By alcoholism (*abusus spirituosorum*) those aggregated morbid signs and tokens are understood which are the effects of long continued abuse of liquors. The history of the abuse of alcoholic beverages is part of the history of civilization of mankind. True, the ancients and our forefathers certainly did practise riotous libations in honor of Bacchus, yet this insobriety never exercised that destroying influence upon the corporeal and mental welfare of the broad masses of the people as does the vice of drunkenness in modern times. Our ancestors

quaffed nothing worse than wine and beer; moreover, of low alcoholic grade. The abuse of spirits only became a general vice with the introduction of spirituous liquors. Its production is to be traced back to the Moors in Spain, as its name (*al-cohol*) indicates. The Arabian physician Abdul Kasim, of Cordova (died in 1106), speaks positively of liquor obtained by distillation.

Drunkenness makes a person ill, bodily and mentally, and acts destructively in ethical and social direction.

(*a*) *Somatic effects of Drunkenness.*

Persons given to the abuse of liquors fall more easily sick and die at an earlier age than moderate drinkers and abstainers. Habitual and excessive use of alcohol deteriorates the entire constitution of the body. Hence vitality and resisting power to morbid agents is lowered. In times of epidemics (cholera, dysentery, pox) drunkards are among the first to fall sick and succumb to the attack in a large number. Furthermore, a drinking man falls a prey to an acute febrile disease more easily than the non-drinker.

This fact is proven by statistics compiled from reports of certain individual life insurance companies in England, which have two divisions: one for insured total-abstainers from liquor, the other for non-abstainers. The death list in the abstinence section, for a space of ten years, amounted to but seventy-one per cent. of the anticipated death cases; in the second section, however, the percentage was ninety-seven. Hence the number of deaths in the former division was twenty-six per cent. less, i. e., over one-quarter less than in the second.

According to recent experiences of an assurance com-

pany in Scotland there occurred among 862 insured tavern and innkeepers 215 death cases, while, according to the mortality list of the company, only 142 death cases were to be expected. Hence this trade evinces an over-mortality amounting to fifty per cent.

The following remarkable statistics anent the effects of the abuse of liquor were compiled by the *Revue Sanitaire de Bordeaux*. The annual mortality in England among males between the ages of twenty-five and sixty-five years reaches:

Among	*Per cent.*
Priests	8.05
Farmers	9.78
Farm laborers	11.86
Inhabitants of the most healthy sections	12.46
Carpenters and joiners	12.71
Coal miners	13.81
Bricklayers	14.92
Leadworkers, glaziers, painters	18.63
Brewers	21.09
Innkeepers	23.57
Help in public houses	34.15

Hence, hard labor, by which a man earns his daily bread, proves less detrimental than the abuse of liquors. Bad food, poor clothes, foul air, unsound dwellings are less harmful than alcohol. Even leadworkers, while handling poisonous material, are better off than brewers, tavern keepers, and the help in public houses. Taking the aggregate years of life reached by 14,176 male persons, who, in their capacity as restaurant, tavern, and innkeepers, brewers, waiters, etc., had been more or less addicted to the abuse of intoxicating beverages, and compar-

ing this total with the total of years attained by persons taken from the general population, and from trades injurious to health, all these persons having died at a corresponding age, Baer has come to the conclusion that "the vitality of persons of the first-named callings at the age of thirty is less than that of an ironworker, and at thirty-five about equal to that of a filecutter. This proportion bears testimony of how the habitual use of alcohol impairs health and shortens life, even when not used to excess."

The intemperate use of spirits affects a person in an *acute* manner thus, that upon the stimulation at first of physical and mental capacity, there follows a paralysis of voluntary muscles and of the cerebral functions (intoxication, poisoning by alcohol). At the highest degrees of intoxication, death by apoplexy is nothing uncommon.

The *chronic* effects of alcoholic abuse are made evident in the first place in the digestive organs, where the pituitaries are directly brought in contact with the stimulating liquid. Catarrhal affections of throat and stomach are soon in order, appetite decreases, thirst increases. With empty stomach, especially in the morning, a choking and heaving sensation is felt. Next, the liver is attacked, gathering a morbid layer of fat. With progressed drunkenness, this organ shrinks, which is especially the case with whisky drinkers. In most cases the kidneys, too, are affected, and form, together with the diseased condition of the liver, the foundation for dropsy. This malady, and pneumonia, constitute equally often the last tableau in the course of a body ruined from sottishness.

Drunkenness not alone undermines the health of the drunkard, its detrimental effects extend also to the *issue of drunkards.*

First of all, it has been established by expert scientists that children begotten in a state of intoxication either are vastly predisposed to mental disorders, or are born idiots, or perish soon of a weak vitality. According to Darwin, the family of drunkards becomes extinct in the fourth generation.

Demme compiled the following evidence of the influence exercised by parent-drunkards upon vitality and health of their issue: He took ten hard drinking families and contrasted them with ten others of unquestionable sobriety. The direct issue of the ten drinking families amounted to fifty-seven children. Of these, twenty-five died within their first weeks or months of life, six were idiots, five children were noticeably slow in growing, five suffered from epileptic fits, five from innate diseases. One boy became afflicted with St. Vitus' dance and ended as an idiot. Hence, of the fifty-seven children by drunkards there were only ten, or 17.5 per cent., in whom normal faculties and developments were noticed.

The ten temperate families produced sixty-one children, of whom but five died off within the first weeks, four suffered from curable affections of their nervous systems; only two children evinced innate defects. The remaining fifty, 81.9 per cent., presented normal faculties and development.

(*b*) *Effects of drunkenness in the psychical sphere.*

Abuse of alcohol is preeminently detrimental to the organ of the mental life: to the brain, both in regard to its structure and to its functions. The drunkard's powers of

perception and of reasoning become blunted, the will power abates.

Drunkenness plays a predominant part in diseases of the mind. One-quarter of all inmates of insane asylums are drunkards, according to the concurring observations by all specialists of experience. In many instances a particular psychosis grows upon the soil of chronic alcoholism, the origin of which is simply due to drunkenness.

Where there is a predisposition to mental morbidity, the abuse of liquors promotes the development of the lurking disease. Such persons are strikingly susceptible for the effects of liquors. Small quantities suffice to produce symptoms of heavy intoxication (pathological intoxication). One of the most frequent intercurrent maladies due to chronic alcoholism is the *delirium tremens potatorum*. As implied by the name itself, its fundamental signs are deliriousness and shaking, accompanied by insomnia and hallucinations.

As casual causes for the outbreak of the delirium must be considered all debilitations, which further enfeeble the drunkard's already impaired and unresisting brain. The principal casual causes are frequent debauches (*a potu nimio*), deprivation of liquor for the habitual stimulation of the nerves (*a potu intermissio*), insufficient food, acute febrile diseases, particularly pneumonia, external injuries, fractured bones. Preceded by forerunners, such as irritability, oppression about the cardiac region, restless sleep, headache, dizziness, the real malady, delirium, breaks out a few days later. Dullness of mind is followed by delusions, hallucinations, at first only after dark, later also in daylight. They consist chiefly of visions of animals. The patients imagine themselves surrounded and beset by rats, mice, dogs, horses, in masses. They lack sleep entirely.

(*c*) *Effects of drunkenness in ethical respects.*

Experience teaches that habitual drunkenness at first decreases in a specific way the moral qualities of man, and destroys them gradually. The drunkard's sense of honor, duty, decency, and manner becomes, by and by, extinguished. Self-control of the intoxicated is impaired; lusts and impulses rise, stronger and more commanding; restraint by will and reflection is utterly out of question. Enlarged self-esteem makes the intoxicated quarrelsome and more sensitive; the latter quality again prompts him to act hastily, to take prompt revenge for an offered insult, real or imaginary.

Hence criminal courts, judges, and prosecutors, are well aware of drunkenness and crime being cause and effect, and find this truism borne out, over and over again, by their daily experience.

An authority, Dr. Krohne, director of a penitentiary, describes the connection between drunkenness and crime as follows:

"Of the criminal assaults upon body and life, the resulting simple or grave injuries are *entirely,* those not deliberate in the assault, but merely accidental, are *almost entirely,* manslaughter, voluntary or involuntary, with but *few exceptions* due to liquor. In many murder cases the courts find liquor to be the cause for the crime.

Crimes against morality, be they rape, malpractice with children or adults, etc., are almost exclusively due to liquor." The same authority arrives at the result that seventy per cent. of all crimes and misdemeanors committed are originally more or less connected with liquor.

(*d*) *Social effects of drunkenness.*

Drunkenness is the most prevalent cause of *pauperism.* As the French physician Picard says, "Poverty and misery follow everywhere in the wake of insobriety, like a shadow follows the body. On the very day when drunkenness shall have vanished, the larger half of pauperism will also have disappeared." In 1885 62 per cent. of all persons supported by public charities in Germany had been pauperized by drinking.

This connection between pecuniary distress and drunkenness need astonish no one who stops to consider that some workingmen spend four-fifths or more of their daily earnings for liquor or beer. How much remains, then, for rent, clothes, and food?

Drunkenness undermines family-life. The drunkard can not find recreation at home with his family, at least, none that satisfies him. He must go into the saloon. By staying in the saloon, he neglects his duties toward his family. His craving for liquor soon absorbs all his means. His folks are put in want and misery. Upon returning home, the drunkard, still under the influence of liquor, possibly somewhat conscience-stricken, is easily irritated, and only too often gives vent to his irritability in dealing with his family. The sufferings of wife and children of a drunkard deserve, in many instances, a crown of martyrdom. Sometimes these family members, through despair and bad example, are also driven to drink.

In view of these pernicious effects of drunkenness upon the populace, clergymen, lawyers, physicians, and social economists have maintained unanimously at all times that something must be done to curb drunkenness. "In recent times," to quote from Paulsen's System of Ethics, "among earnest and thinking men the conviction gains

more and more ground that in intemperance there lies an extraordinary danger for the entire further development of life among civilized nations. How shall we meet it?"

As a preventive it has been justly recommended to begin early, with the growing young people. They should be warned of drunkenness as being a vice noxious to body and soul. A powerful influence in this direction can especially be exerted by the Catechist in school.

Looking around, first of all, among working-people, in our search for preventives, we note that all such associations that have for their object the saving of money, as for instance building and loan associations, are efficient antidotes against the poison of drink.

Considerable influence in the same direction must be attributed also to the working-girls' associations, where working-women receive tuition and training in housekeeping and in female handicraft. Well-trained, domestic wives keep their husbands to sobriety and thrift. Proofs of the opposite can be found in abundance in everyday life.

An indispensable armament in the war against drunkenness are the *temperance societies.* They were founded at the end of the eighteenth and the beginning of the nineteenth century, at first in America and England. The abuse of liquors in both countries had assumed such proportions that something had to be done to curb the evil. The members of these societies abstain altogether from spirituous liquors and endeavor by word and example to gain additional converts to the cause of abstinence.

In combating against the abuse of alcohol it became the duty of the government to reduce the *opportunity* to obtain liquor.

The plan of limiting the production of alcohol, as ad-

vocated formerly, is to be dismissed for political economical reasons.

On the other hand, government has an effective means of reduction at its disposal—*limiting the selling places,* restricting the sale of liquor to certain hours of the day, and by a large prohibitive tax.

Finally, it is the duty of the government to provide that only pure and unadulterated liquors are sold. Particularly should only those spirits be allowed to be sold for drinking purposes which are free from fusel oil.

To liberate the drunkard from his pernicious passion there is usually no other means than his stay in a *drunkard's asylum.* Here, apparently, lies yet an open field for the activity of the religious orders, which might be entered not without success.

VI.—Morphinism.

Morphinism is the term applied to the passion of a person for morphine as a stimulant or a relish, because they are unable to forego the medicament without disturbing their condition or well feeling. The term is also used to express the state of sickness engendered by the misuse of that medicine. *Morphia* is the most important constituent of the milky juice of the white poppy, *papaver somniferum.* Its effect upon the human body is expressed in the ominous words: *It mitigates pain and brings sleep.* These effects are quickened if the medicine is not introduced in the stomach, but injected subcutaneously with a hypodermic syringe.

The beneficial influence of subcutaneous injections of morphia on wounded and sick became especially apparent in Germany during the war of 1866. Since then it has

been ever more widely used. The technique of injection being easy to acquire, the physician soon lost control of the remedy, which fell in the hand of the laity, the patient. Thus the fatal step was done. For injected morphia not only abates insomnia and bodily pain; it transforms at the same time the whole person, producing a state of agreeable excitement which is analogous only to the effect of alcohol.

The mood changes, the gloomy, through morphia-injection, becomes cheerful; it imparts force to the faint, energy to the weakling, in brief, self-consciousness, confidence in one's own power and ability is heightened.

With the excernment of morphia from the body there follows, however, a state of deep depression. There is no other saving clause to lead out of this wretched state but the helpful syringe, to which the morphia fiend has recourse, as the sot to the liquor flask, to raise his depressed spirits, to sharpen his wits, and to steady his trembling limbs. To achieve the longed-for result it is necessary to steadily increase the doses, because the organism gets used to the poison. Thus, the morphia fiend is compelled to put always larger, frightening large, quantities into his body, till he becomes a mental and physical wreck.

The morphia habit recruits its victims almost exclusively from the more cultured and higher circles of society. The impecunious who only learn to know morphia at the hand of the physician or at the hospital are in no position to obtain the medicine after their discharge as cured.

Persons that acquire the morphia habit are preponderantly physicians; then follow druggists and army officers. The female sex is also disposed, in a high degree, to the misuse of morphia injections.

The sole curative against the habit is to deprive the victims of their accustomed stimulant. Such a cure is, however, only possible in a well managed institution, and it is accompanied by violent pains, both corporeal and psychical.

Many persons cured of the morphia habit develop a desire for alcohol, and thus encounter a new danger.

THIRD PART.

FIRST AID TO THE INJURED.*

I.—Hemorrhage and its Immediate Treatment.

DEFINITION.—Hemorrhage may be defined as the escape of blood from the heart or the blood-vessels.

THE CAUSES are: (i,) *Injury;* (ii,) *Disease.*

THE SITUATION.—Hemorrhage may be either:—

(i,) *External.*—This is most frequently the result of injury.

(ii,) *Internal.*—This is generally due to disease.

THE SYMPTOMS of Hemorrhage are:—The actual appearance of blood (which is always seen in external hemorrhage, while in internal hemorrhage blood may also reveal its presence —*e. g.,* in bleeding from the lungs, etc.), and the constitutional effects, more or less, which follow the loss of blood, *i. e.,* the signs of *syncope* or *fainting,* which are indicated by a cold and clammy skin, a pallid and livid face, dilated pupils, feeble and irregular breathing, an irregular and almost imperceptible pulse, dizziness, inclination to vomit, and loss of consciousness. These constitutional effects are in proportion to the suddenness of the loss of blood, *i. e.,* the quicker the loss, the more profound the syncope.

VARIETIES of Hemorrhage.—The severity of the bleeding varies with the portion of the vascular circuit which is wounded, and hemorrhage presents different characteristics according to its origin from capillaries, veins or arteries respectively:—

1. *Capillary.*—This is the least dangerous form; it is indicated by a general oozing from the whole surface of a wound, and the color of the blood is more or less brick red.

2. *Venous.*—This is indicated by the blood flowing in a continuous stream, and issuing from the cut end of the vessel furthest from the heart, *i. e.,* in the limbs from below the wound, the color of the blood being a dark purple. Venous hemorrhage comes next in seriousness to arterial.

3. *Arterial.*—This is the most serious form of bleeding; it is indicated by the blood flowing in a forcible pulsatile stream (which rises with each beat of the heart and falls in the interval), and issuing from the cut end of the vessel nearest the heart, *i. e.,* in the limbs from above the wound, the color of the blood being a bright scarlet.

* The following embodies directions for First Aid by the English physicians Warwick and Tunstall, both acknowledged authorities on the subject.

External Hemorrhage.

1. THE TREATMENT OF CAPILLARY HEMORRHAGE.—Expose the part to the air and apply pressure to the wound to close the vessels, and prevent further escape of blood. This may be done by means of a perfectly clean finger, or a clean bit of sponge or lint. If the above means are not sufficient, encourage coagulation of blood, so that the clot may seal the cut vessels; this may be done by the application of clean cold water, or hot water at a temperature of 100° to 120° F., or by first drying the part and then applying a *styptic,* such as common salt, burnt or dried alum, tincture of steel, turpentine, tannic or gallic acid, tincture of eucalyptus, etc.

Note.—Styptics are not to be applied too strong, otherwise they destroy the vitality of the tissues.

2. THE TREATMENT OF VENOUS HEMORRHAGE.—In treating bleeding from veins, adopt the following measures, viz.:—

(i,) Remove all constrictions which impede the backward flow of blood to the heart, *i. e.,* all tight clothing about the chest and neck must be loosened, garters undone, etc.

(ii,) Elevate the bleeding part if possible above the level of the heart, *i. e.,* if the bleeding is from a limb, raise it.

(iii,) Apply first digital pressure (pressure with perfectly clean fingers), *directly* to the surface of the wound, and then place a clean pad on the wound and keep it in position by a bandage.

(iv,) Keep the wounded part in an elevated position (if possible) for some hours after the bleeding has stopped.

The Immediate Treatment of a Burst Varicose Vein.—The superficial veins of the lower extremity are liable to become dilated or *varicose,* from the incompetency of their valves and the consequent undue pressure of the column of blood upon their walls; these dilated veins may burst, producing serious or even fatal hemorrhage if not promptly attended to; the measures therefore to be adopted in dealing with a condition of this description are as follows:—

(i,) Place the patient at once on his back.

(ii,) Remove all constrictions round the limb on the heart side.

(iii,) Raise the wounded leg.

(iv,) Expose the bleeding surface, place a clean pad directly on the wound and fix it, by means of a triangular bandage.

(v,) If the patient has to be removed, carry him on a stretcher, lying on his back with his foot raised.

(vi,) Keep the patient in a recumbent position with the foot raised for some hours after the accident.

(vii,) If the bleeding has been at all excessive keep the patient warm, in order to counteract any sudden failure of the heart's action.

3. TREATMENT OF ARTERIAL HEMORRHAGE.—In arterial bleeding the force of the heart's beat pumping the blood through the cut vessel prevents any chance of clotting, therefore the two main factors in stopping bleeding are:—

(i,) To place the bleeding part, if possible, in a *proper position, i. e.,* above the level of the heart, at the same time expose the wound to the air, and remove all constrictions which impede the return of venous blood.

(ii,) To apply *pressure* to the wound itself or to the main artery supplying the part. Pressure should always first be applied with the thumb and finger (*digital* pressure), so that no time is lost in getting appliances.

To aid the above means, the patient should be kept *absolutely quiet* and in a *recumbent position.*

Should there be any constitutional symptoms (*syncope*), these must be treated. (See page 178.)

"FIRST AID" METHODS OF CONTROLLING ARTERIAL HEMORRHAGE.—The measures to be adopted will depend upon the severity of the bleeding.

1. IF THE BLEEDING IS NOT EXCESSIVE, *i. e.,* in all superficial hemorrhages apply:—

(i,) Firm *pressure* directly to the bleeding point by means of absolutely clean fingers, and when the bleeding has quite stopped place

(ii,) A clean *pad* over the wound and keep it in position either by means of a folded triangular bandage, or by a roller bandage.

In some situations, *e. g.,* the palm of the hand, a *graduated compress* (made by superimposing several layers of clean lint upon each other, the smallest piece being about the size of a quarter and the largest that of a 50 cent piece) is more effective than a simple pad.

2. IF THE BLEEDING IS EXCESSIVE, apply if possible:—

(i,) *Digital Compression* (compression by means of the fingers) to the main artery supplying the part with blood. This

pressure is applied to the artery between the wound and the heart, and at a joint where some hard basis of support is furnished, against which the artery can be pressed, *e. g.,* where the vessel passes over or along a bone.

The great value of digital compression is that it can be applied immediately. In digital compression the following points are to be remembered:—

(*a,*) To use the thumb to make the pressure.

(*b,*) Having ascertained the position of the artery by its *pulsation,* get it fairly against the bone, and press directly upon it, using sufficient force just to stop the bleeding but not to cause the patient any pain.

(*c,*) Compress if possible the *artery only,* avoiding all adjacent structures such as veins and nerves. Digital compression is only applicable in certain parts of the body, *viz.,* the limbs, the neck, and some parts of the head and face, and it can not be effectively maintained by one person for more than about fifteen minutes at a time.

(ii,) *Replace Digital Compression* by applying a hard pad upon the artery, and keeping it in position by a bandage.

THE TREATMENT OF CONSTITUTIONAL SYMPTOMS.—In order to counteract syncope or fainting due to the loss of blood, the patient must be kept at absolute rest in a recumbent position with the feet slightly raised; his clothes should be removed, his body should be wrapped in warm blankets, and hot-water bottles should be applied to his feet. If able to swallow, stimulants well diluted are to be given in small quantities, but only after the hemorrhage has entirely stopped. If the loss of blood has been very excessive, the breathing may become embarrassed, or may actually stop; *artificial respiration* must then be resorted to.

Internal Hemorrhage.

The CAUSES of internal hemorrhage are:—

(i,) *Injury* from blows, punctured wounds, severe crushes, and falls causing bruising and laceration of internal organs.

(ii,) *Disease* producing bursting of a blood-vessel.

The blood in internal hemorrhage may either escape into one of the closed cavities of the body, such as the abdomen, cranium, or thorax, or it may make its escape externally through an opening in the body, artificial or natural.

Serious hemorrhage into a closed cavity is denoted by the history of the accident and the signs of syncope or fainting.

Measures to be adopted in a condition of this description are:—

(i,) To send at once for medical assistance.

(ii,) In the meanwhile to treat the constitutional symptoms which are due to the loss of blood.

When the blood makes its escape through one of the natural openings of the body, it make take the form of:—

(1,) *Blood Spitting;* (2,) *Blood Vomiting;* (3,) *Nose Bleeding.*

1. BLOOD SPITTING.—This may proceed from:—

(*a*,) *The Mucous Membrane of the Mouth,* especially the gums, or from the cavity left after the extraction of a tooth.

TREATMENT.—If the bleeding is slight, the patient must wash his mouth out with hot water, as hot as it can be borne, or with a solution of alum, or with a strong solution of salt and water, or small pieces of ice must be given him to suck. If the bleeding is from the socket of a tooth, plug it well with a pledget of cotton wool which has been dipped in a solution of salt and water. If the bleeding is severe, apply pressure directly to the bleeding point if possible, by means of a small pad of clean lint.

(*b*,) *The Throat,* caused by injury to the wind pipe or gullet.

TREATMENT.—Keep the patient quiet in a reclining position, and give him small pieces of ice to suck at frequent intervals.

(*c*,) *The Posterior Surface of the Mucous Membrane of the Nose.*

TREATMENT. (*See* Bleeding from the Nose.)

(*d*,) *From the Lungs.*—Bleeding from the lungs is indicated by scarlet and frothy blood coughed up in mouthfuls. It is usually the result of either disease of the lungs or injury to the ribs.

TREATMENT.—(i,) Send at once for medical assistance, in the meanwhile—

(ii,) Lay the patient down on his side with his head and shoulders slightly raised on a pillow; keep him absolutely quiet, and prevent him from talking or making the slightest exertion.

(iii,) Open the windows and admit plenty of fresh, cool air.

(iv,) Give the patient ice to suck, or let him sip cold water, or vinegar and cold water, or a strong solution of alum and water, or strong cold tea with a lump of ice in it.

(v,) Remove all constrictions round the patient's chest, and apply cold to it either by means of an ice bag, or a cloth which has been rung out in ice-cold water.

(vi,) If the faintness is severe, be cautious in the administration of stimulants.

(vii,) Apply smelling salts to nostrils, and warmth to the feet.

2. BLOOD VOMITING.—This is usually caused by disease affecting the *walls of the stomach.*

Its occurrence is preceded by faintness, with a feeling of weight at the pit of the stomach, paleness in the face, and a feeble pulse. The blood vomited up is dark in color, sometimes coagulated and mixed with food, and presents the appearance more or less of coffee grounds.

TREATMENT.—The same as that for bleeding from the lungs.

3. BLEEDING FROM THE NOSE.—This may be due to injury to the nose; it may be an effort of nature to relieve a diseased condition, and if so it is not to be lightly stopped; or it may be the result of general constitutional disturbance.

TREATMENT.—If severe, send at once for medical assistance and take care that the doctor is made acquainted with the nature of the case; in the meanwhile undo all tight clothing round the neck, make the patient sit down on a chair or sofa, with his head slightly thrown back (never allow the patient to hang his head over a basin), open the window, raise the arms stretched to their full extent, well above and behind the head, and keep them in that position, apply a cold wet sponge, or a wet towel, or a lump of ice to the back of the neck between the shoulder blades, also apply cold to the root of the nose; if the bleeding does not stop, syringe out the nostril from which the blood is flowing with cold water, or with a solution of alum (1 to 2 teaspoonfuls to a pint of water), or with cold tea. Pinch the nose just below the bridge between the thumb and forefinger, or take a piece of soft rag, wrap it up tightly and pass it gently into the bleeding nostril.

II.—WOUNDS AND THEIR IMMEDIATE TREATMENT.

DEFINITION.—Wounds may be defined as injuries to the body with division of the skin and of the underlying parts, more or less.

Wounds are of two kinds:—I. *Simple;* II. *Poisoned.*

I.—SIMPLE WOUNDS present the following varieties:—

(*a*) *Incised or Clean Cut Wounds.*—Wounds with cleanly

divided edges and more or less free bleeding, produced by sharp edged instruments.

(*b*,) *Contused or Bruised Wounds.*—Wounds with bruising of the parts and only slight or no external bleeding, produced by blunt instruments.

(*c*,) *Punctured or Stab Wounds.*—Wounds with, as a rule, considerable bleeding and deep internal injuries, produced by shart pointed instruments.

(*d*,) *Lacerated Wounds.*—Wounds with ragged edges and very little bleeding, caused by tears, as from machinery in motion, the bites of animals, etc.

Bullet wounds generally combine the characters of punctured and lacerated wounds, with, in some cases, injury to the bone.

The Immediate Treatment of Wounds in General.

Here the following points are to be borne in mind:—

(i,) To arrest the bleeding.

(ii,) To cleanse the wound.

(iii,) To keep the wounded parts, if possible, at rest by the application of slings or splints.

(iv,) To protect the wound from outside dust and dirt by means of some antiseptic (clean) dressing material.

(v,) To treat constitutional symptoms, if any, such as shock.

Therefore, when a wound has been inflicted, the first thing to do is to avoid touching it with dirty hands or dirty instruments; there is no justification for introducing more dirt into the wound that may be already dirty.

After arresting the bleeding proceed as follows:—

If no means are ready available to render the hands and the wound clean, either leave the wound alone or cover it up with some antiseptic dressing, if one can be got at once, till means are at hand to cleanse the wound.

TO CLEANSE THE WOUND do not attempt to wash it with water procured from any source. Before handling the wound with the fingers wash the hands first with warm water and soap, and then rub them with turpentine or rinse them in carbolic solution 1 in 40, then wash the wound thoroughly with an antiseptic solution, such as carbolic acid 1 in 20 to 1 in 40, or perchloride of mercury 1 in 1000 to 1 in 2000.

If the above solutions are not at hand or can not be easily procured, any of the following may be used:—

Alcohol, in the form of whisky or methylated spirits, with an equal bulk of water which has been first well boiled and then allowed to cool.

Common Salt, a dessertspoonful dissolved in a tumbler of warm water.

In washing the wound be careful not to detach any blood clots which may have formed in it, as they prevent further bleeding and exclude impurities.

After the wound has been well cleansed of all dirt, in order to keep it clean take a pledget of cotton wool, soak it well in the antiseptic solution which has been used to wash the wound, squeeze it dry and place it over the wound as a temporary protection.

TO DRESS THE WOUND proceed as follows:—If ready-made antiseptic surgical dressings are at hand use them, if not, place on the wound either—

A piece of clean linen which has been well boiled for five minutes and then wrung out, or a piece of lint soaked in carbolic solution 1 in 40, carbolic oil 1 in 10.

Over this apply a few layers of clean cotton wool, and then a bandage to keep the dressing in position.

TO KEEP THE PARTS AT REST.—First place the edges as near together as possible by strapping, and then, should the wound be in the upper extremity, put the forearm in a large arm sling; if the wound happens to be near a joint, apply a splint and then put on the sling; if the lower extremity is wounded apply an outside splint to the limb. Should the wound be in the abdomen or chest, bandage firmly.

Special Points in the Immediate Treatment of—

1. INCISED WOUNDS.—Arrest the bleeding: then, if necessary, wash and dress the wound as indicated above; if the edges of the wound gape, adjust them by means of strapping, taking care not to completely cover the wound; the strapping is best applied thus—two strips of strapping long enough to reach well beyond the edges of the wound are taken, in the centre of one piece a longitudinal slit is cut, the edges out of the centre of the other piece are cut away, so that this piece can

fit into the longitudinal slit, one piece is now placed on one side of the wound, the other piece on the other side, the middle parts are slipped one into the other and an even pull is made simultaneously on both.

2. CONTUSED WOUNDS.—Apply pressure to the part by means of a pad of cotton wool or linen dipped in one of the antiseptic solutions enumerated above if the skin is broken, and fix the pad by a narrow folded triangular bandage, or a figure of 8 roller bandage; should the skin not be broken, apply to the part a piece of lint which has been soaked in a lotion consisting of spirits of wine one-third and water two-thirds; and moisten it often.

3. PUNCTURED WOUNDS.—Arrest the bleeding and wash and dress the wound.

4. LACERATED WOUNDS.—Wash and dress the wound. Shock usually supervenes after severe lacerations, therefore if present, treat it.

II.—POISONED WOUNDS.

These may be—

(*a,*) *The True Poisoned Wound.*—Produced by the introduction of decomposing animal matter or other dirt under the skin.

TREATMENT.—Wash the part immediately with a strong disinfectant.

(*b,*) *Stings of Insects.*

TREATMENT.—Extract the sting by pressing a small key (a watch key is the best) on to the wounded part, wash the wound with a solution of ammonia, soda or potash, or with an antiseptic solution.

A certain amount of shock may sometimes supervene; if so, give stimulants.

(*c,*) *Snake Bites.*

TREATMENT.—Send for medical assistance, but in the meanwhile apply a ligature or an improvised tourniquet on the limb between the wound and the heart, to prevent the general absorption of the poison into the system; bathe the wounded part first with warm water to encourage bleeding, then with strong antiseptic solutions, then cauterize the wound with a red hot iron, or nitrate of silver. To extract the poison, sucking the wound may be resorted to, but the operator should see that he has no cuts or fissures about his lips or tongue. Treat shock if

present by administering stimulants *freely,* and artificial respiration may have to be resorted to.

(*d,*) *Bites by Mad Dogs.*—Adopt *treatment* the same as that for Snake bites.

III.—Sprains, Dislocations, Fractures, and their Immediate Treatment.

Sprains.

DEFINITION.—A sprain is the straining or tearing of the *ligaments* and *capsule* which surround a joint, by a sudden twist or wrench—a sprain is practically a "missed dislocation."

CAUSES:—Falls on to, or some sudden and unnatural movement of, a joint.

SIGNS:—Pain, heat, and swelling at the seat of the injury, followed subsequently by discoloration of the skin.

Treatment.—Put the parts at complete rest; if the sprain is in a joint of the upper extremity, apply a padded splint to the inside of the limb, and then place the forearm in a large arm sling; if in a joint of the lower extremity, place the patient in bed, apply a padded back splint to the limb and keep it slightly elevated. After the limb has been put at rest, apply bandages dipped in cold water, or an ice bag, to the injured joint; if the pain is severe and cold applications can not be tolerated, bathe the joint with water as hot as it can be borne comfortably, or apply hot bran poultices to it.

Dislocations.

DEFINITION.—A dislocation is the displacement of a bone at a joint.

CAUSES:—The same as those of a sprain, but applied more violently.

SIGNS:—(*a,*) Distortion of the joint.
(*b,*) The end of the displaced bone may be felt through the skin.
(*c,*) Alteration in the length of the limb.
(*d,*) Loss of movement at the joint.
(*e,*) Pain in the joint increased on movement.

(*f*,) The limb is fixed when another tries to move it (thus distinguishing it from fracture near a joint).

TREATMENT.—Make no attempt to reduce the dislocation; put the parts at complete rest to relieve pain, place the patient in an easy position and send for medical assistance.

Fractures.

DEFINITION.—A fracture is a broken bone.

Causes:—

1. *Direct violence,* by means of which the bone is broken at the seat of the injury.

2. *Indirect violence,* by means of which the bone is broken at some distance from the seat of the injury by transmission of the force applied, *e. g.,* fracture of the collar bone by a fall upon the outstretched hand; fracture of the base of the skull by a fall from a height upon the feet.

3. *Muscular action*—snapping the bone across by a sudden and violent contraction, *e. g.,* the knee-cap in jumping.

VARIETIES OF FRACTURES. These are:—

I.—*Simple.*—Where the bone only is broken.

II.—*Compound.*—Where the bone is broken and there is an external wound communicating with the break.

Fractures may be:—

(i,) *Comminuted.*—Where the bone is splintered into several fragments.

(ii,) *Complicated.*—Where the fracture is complicated by an injury to some important surrounding parts, *e. g.,* the tearing of an artery, vein or nerve; the opening up of a joint; the wounding of an internal organ, as the lung, bladder, etc.

(iii,) *Impacted.*—Where the bones are broken and the ends are wedged into one another.

(iv,) *Greenstick.*—Where the bone is incompletely broken or bent—usually met with in children.

REPAIR OF FRACTURES.—Fractures are repaired by the space between the broken ends of the bone and the torn periosteum being filled up by a soft mass of new material—termed *callus,* which unites the broken ends together; in course of time this soft material is converted into fibrous tissue, then lime salts are deposited in it and it is gradually formed into bone; the new bone can at first be felt as a thickened mass round the fracture,

but gradually it becomes entirely absorbed. Should the broken ends of a bone not be kept at complete rest *bony union* never results, the callus remains *fibrous* and there is produced what is termed a false joint.

SIGNS OF FRACTURE.—These are:—

(*a*,) Pain, swelling, and deformity at the seat of the injury.

(*b*,) Unnatural mobility where none should exist.

(*c*,) Loss of power in the limb.

(*d*,) Shortening of the limb.

(*e*,) Crepitus, *i. e.*, a sensation of grating felt when the broken ends of the bones are made to move against each other.

TREATMENT.—In the immediate treatment of a fracture the following points have to be borne in mind:—*The Prevention of Further Injury. The Proper Transport of the Injured Person.*

THE PREVENTION OF FURTHER INJURY.—For this adopt the following measures *viz.*:—

1, Attend to the patient on the spot where the injury has occurred, and especially so if the fracture happens to be in the lower extremity.

2, Don't touch the limb (beyond what is absolutely necessary for diagnosis), until you have got all splints and bandages ready.

3, Use extreme care and gentleness in handling the limb, either for the purpose of trying to make out the fracture (*i. e.*, trying for crepitus, etc.), or in putting on splints: by rough handling a *simple* fracture may very easily be made into a *compound* or *complicated* one. This precaution is to be especially borne in mind in handling broken bones which are immediately under the skin, such as the collar bone (clavicle), and the shin bone (tibia).

4, Without removing the clothes (unless the fracture is compound or there is hemorrhage), bring the bones into their relative position as follows: First lift the limb by grasping it very gently but firmly *above* and *below* the seat of the fracture, and then make gentle extension and counter-extension to restore to its natural position as far as possible.

5, Fix the limb in this position by means of splints and bandages.

THE PROPER TRANSPORT OF THE INJURED PERSON.—It is important to bear in mind that a person suffering from a fracture is not to be removed till the broken bone has been first *put up*. If able to walk, he should not be permitted to

leave the spot unassisted, as faintness, giddiness, or even unconsciousness may come on some time after the fracture has occurred; most persons suffering from fractures of the upper limb can walk if assisted. Those suffering from fractures of the lower limb should always be carried on a stretcher.

The Immediate Treatment of a Compound Fracture.

Here proceed as follows:—

Remove the clothing, if required, from the injured part with *extreme care.* If there is *hemorrhage,* arrest it either by elevating the limb, or applying pressure to the main artery, above the wound. If transport is readily available, and skilled help can be quickly obtained, cover the wound temporarily with an antiseptic (clean) pad to prevent the entrance of impurities, apply splints as far as practicable in the manner indicated above and remove the patient from the scene of the accident. If skilled help can not be speedily procured, thoroughly cleanse the wound with an antiseptic solution, adopting all the precautions laid down in Chapter II; apply an antiseptic dressing to the wound, then put on the splints and remove the patient.

IV.—Artificial Respiration and the Treatment of Asphyxia.

Artificial Respiration.

Various *methods* have been proposed for performing artificial respiration. Those most usually adopted are:—

1, *Dr. Sylvester's Method.*

2, *Dr. Benjamin Howard's "Direct Method."*

3, *Dr. Marshall Hall's "Ready Method."*

1. THE SYLVESTER METHOD.—This method has the following points to recommend it:—

(i,) It is simple.

(ii,) It is effective.

(iii,) It is to a great extent in harmony with the process of natural respiration.

(iv,) The expansion of the thorax is artificially insured, and the method is wholly under the control of the operator.

(v,) The patient is not liable to be injured by the manipulations.

(vi,) Both sides of the chest are equally inflated and a large amount of air is inspired.

(vii,) The adoption of the method is easy. It can be remembered and it can be efficiently put into operation by one person.

Mode of Procedure.—Lay the patient flat on his back on the floor, loosen all tight clothing about the neck, chest, and abdomen, and loosen the braces; place a block or hard pillow under the patient's shoulders (in order to raise the chest, extend the neck and throw the head back), draw forward the tongue and get an assistant to hold it in the corner of a handkerchief between the thumb and finger; if unassisted, fasten the tongue round the chin by an indiarubber band or a piece of string.

Now kneel at the patient's head; take hold of his arms above the elbows and carry them well over the head as far back as they will go, this will have the effect of expanding the chest. Hold the arms in this position for two seconds, then bring them down against the ribs, cross the forearms over the pit of the stomach, and, kneeling well forward, make steady pressure upon the sides and front of the chest; keep up this pressure for two seconds. This will have the effect of expelling the air from the chest.

Repeat the above movements carefully and deliberately about fifteen times a minute till the natural respiration becomes established. This will be indicated by the patient beginning to take short gasps. Then cease the movements, but watch the patient carefully for some time, as the respiration, after being once established, is again liable to fail and may have to be restored.

If the expansion and the compression of the chest are efficiently performed, the flow of air in and out of the larynx can be distinctly heard.

2. DR. BENJAMIN HOWARD'S "DIRECT METHOD."—This method has the advantage that it can be used in cases where there is injury to the arms.

It is more vigorous than the "Sylvester method," and it is easily put into practice, but it has the disadvantage that, if forcible pressure is used by an unskilled operator, the patient runs the risk of being injured during its performance.

Mode of Procedure.—Lay the patient flat on his back, put a hard pillow or roll of clothing (larger than that used in the "Sylvester method") well under the back in order that the lower part of the chest may be the highest, place the patient's forearms crossed on the top of the forehead, and strip the clothing from the waist and neck.

Now kneel astride the patient's hips, facing his head, place the hands, with the fingers spread well apart, on the most compressible part of the lower ribs, taking care that the thumbs do not press upon the pit of the stomach, and squeeze together the two sides of the patient's chest at the same time, leaning gradually forward till the whole weight is over the patient and the mouth is nearly touching that of the patient's; remain in this position for two seconds, then spring back to the kneeling position, lifting the hands off the patient's sides.

Continue these movements at the rate of about fifteen a minute till the respiration becomes established.

3, DR. MARSHALL HALL'S "READY METHOD."—This is the least efficient of the three methods, as only one side of the chest is compressed, and expansion of the lung can only take place on the non-compressed side.

It is also the mildest, it requires considerable practice before one can be efficient in it, and it needs three persons to perform it.

Mode of Procedure.—Take up a position on the left side of the patient, make one assistant kneel at the patient's head and another assistant at the patient's feet, place a hard roll of clothing (which must be twice as long as that used in Howard's method) in such a manner that when the patient is turned over his chest will be across the roll.

Now with the help of the two assistants turn the patient face downward, making the body incline over the roll of clothing, and make firm pressure with the hand upon the back, between and on the shoulder blades, then turn the body on the side again. In turning the patient the assistant at the head must see that the patient's arms are not laid upon or twisted.

Repeat these movements and continue them at the rate of fifteen a minute till respiration becomes established.

Asphyxia and its Treatment.

DEFINITION.—By asphyxia is meant the condition which supervenes when the function of respiration has been interrupted. Death from asphyxia is due to carbonic acid poisoning.

Asphyxia may be caused by:—

(i,) Submersion in a liquid medium, as in drowning.

(ii,) Occlusion of the air passages by foreign bodies, as in choking.

(iii,) Pressure on the chest, preventing the action of the respiratory muscles.

(iv,) Closure of the air passages, as in suffocation or smothering.

(v,) External pressure on the air passages, as in strangulation or hanging.

(vi,) Breathing irrespirable gases, such as nitrogen, hydrogen, carbonic oxide, sulphuretted hydrogen, chlorine, chloroform vapor, etc.

THE TREATMENT OF ASPHYXIA.—For some minutes (about four) after the respirations have entirely stopped the heart's action continues, and as long as the heart beats recovery from asphyxia is possible.

The main indications for treatment are:—

(i,) To remove as quickly as possible the cause of the asphyxia.

(ii,) To effect the purification of the blood by introducing fresh air into the lungs by means of artificial respiration or otherwise.

THE TREATMENT OF APPARENT DEATH FROM DROWNING.—The appearances presented by a person who has been immersed for some time in the water are as follows:—

The face is swollen and purple, the lips are livid, the eyes are blood-shot, the mouth, wind-pipe and lungs contain frothy fluid, there is a considerable quantity of water in the stomach, the feet and hands may be swollen and discolored, and the body is cold.

In treating the apparently drowned the following factors have to be borne in mind:—

(i,) The condition of asphyxia due chiefly to submersion, but also to the blocking of the air passages with water, mud, etc.

(ii,) The shock to the system.

(iii,) The exhaustion from long-continued struggling.

(iv,) The effect of exposure to the cold.

The most important factor, however, in treatment is to remove the condition of asphyxia as soon as possible by artificial respiration.

DIRECTIONS FOR RESTORING THE APPARENTLY DROWNED:—

(i,) Send at once for medical assistance, blankets and dry clothing, in the meanwhile—

(ii,) Immediately proceed to treat the patient on the spot, by *first restoring the breathing,* and, after the breathing has been restored, by *promoting warmth and circulation.* It is important not to attempt to restore the circulation till the breathing has recommenced, as by over-taxing an already dilated heart, life is endangered.

TO RESTORE NATURAL BREATHING, proceed as follows:—

(*a.*) *Clear the Air Passages.*—To effect this, first remove all tight clothing constricting the neck and chest, then turn the patient face downward, placing a firm roll of clothing under his stomach and chest, and one of his arms under the forehead so as to raise the mouth off the ground, now press firmly two or three times, for four or five seconds each time, upon the patient's back, this will have the effect of draining off water from the lungs and stomach.

(*b,*) *Adjust the Patient's Position,* by turning him on to his back with the roll of clothing under his shoulder blades, and allowing the head to fall back.

(*c,*) *Maintain a free entrance of air into the Wind Pipe.*—To do this examine the mouth and remove from it all weeds, mud, lumps of food, etc.; draw forward the patient's tongue and keep it projecting beyond the lips by an elastic band or a piece of tape or string passed over it and under the chin; look to the nostrils and free them from any obstructions.

(*d,*) *Imitate the Movements of Breathing, i. e.,* perform "Sylvester's Method" of Artificial Respiration (See page 195), and continue it till the patient makes an effort to breathe.

(*e,*) *Encourage Breathing.*—If any assistants are at hand during the performance of artificial respiration, get them to excite the nostrils with snuff or smelling salts, or to tickle the throat with a feather, also to rub the face and chest briskly.

While artificial respiration is being performed, make those who are assisting dry the patient's hands and feet, and (if warm clothing has been procured), to strip off the wet clothes and replace them with dry ones, but in doing this, the efforts to restore respiration must not be hindered. As soon as breathing has commenced proceed *to promote warmth and circulation.* To do this, wrap the patient up in dry blankets and commence rubbing the limbs upward, firmly and energetically, with warm flannels or cloths, either under the blankets or over the dry clothing. Apply hot flannels, hot water bottles, hot bricks, etc., to the pit of the stomach, to the armpits, between the thighs, and to the soles of the feet.

When the patient is able to swallow, give him small quantities of wine, warm brandy and water, or hot coffee.

Put the patient to bed and encourage sleep. During the period of reaction the breathing may become oppressed. To obviate this, apply large linseed meal and mustard poultices to the chest and back. Watch the patient carefully for some time to see that the breathing does not again fail; if any signs of failure appear, resume artificial respiration.

Note.—The above efforts to restore life must be persevered in until the arrival of medical assistance or until the pulse and breathing have ceased for at least an hour.

CAUTIONS.—The following are to be borne in mind:—

(i,) Avoid delay in the application of measures to restore life.

(ii,) Do not waste much time in the preliminary operations, *i. e.,* in clearing the air passages, adjusting the patient's position, and maintaining a free entrance of air into the wind pipe, but proceed to perform artificial respiration as quickly as possible.

(iii), Prevent crowding round the patient, especially if in an apartment.

(iv,) Avoid rough usage, and do not allow the body to remain on the back unless the tongue is secured.

(v,) Avoid attempts to give stimulants till the patient is well able to swallow.

(vi), In performing artificial respiration avoid hurried and irregular motions.

(ii,) Avoid an overheated room.

(viii,) Under no circumstances hold the body up by the feet.

(ix,) On no account place the patient in a warm bath unless under medical observation.

(x,) Avoid giving up hope for the patient too soon.

ASPHYXIA FROM CHOKING.—Choking is caused by bits of food, foreign bodies, etc., accidentally passing into the larynx.

TREATMENT.—Send at once for medical assistance, but in the meanwhile make attempts to dislodge the obstruction by first placing the patient in the recumbent position with the head turned on one side, and then passing the finger or the handle of a spoon over the base of the tongue, and clawing forward with it. If the patient happens to be a child, it may be held up by the feet and slapped on the back. If, after the foreign body has been extracted, there are no signs of breathing, begin artificial respiration at once and continue it for at least an hour.

ASPHYXIA FROM BLOCKING OF THE LARYNX, CAUSED BY SWELLING OF THE MUCOUS MEMBRANE. —Suffocation in children is often caused by attempting to drink from the spout of a kettle containing boiling water.

TREATMENT.—Send at once for medical assistance, but in the meanwhile wrap the child in a blanket, apply hot sponges, hot flannels (dry or moist) to the mouth; administer, in dessert-spoonful doses, salad, linseed, or cod-liver oil, and also give pieces of ice to suck.

ASPHYXIA FROM ATTEMPTED HANGING OR STRANGULATION.

TREATMENT.—Release the patient at once, loosen or cut any cords which may be round his neck, also all tight clothing; allow a free current of air to pass over his face, dash cold water on his face and chest, and perform artificial respiration.

ASPHYXIA FROM BREATHING IRRESPIRABLE AND POISONOUS GASES.—These gases include the vapors from charcoal, coal and coke, lime, brick and cement kilns, coal gas, the foul air from sewers, cesspools and mines (choke damp), the vapor of chloroform, etc.

TREATMENT.—Remove the patient at once from the foul into fresh air, loosen all tight clothing, commence artificial respiration after drawing the tongue forward and securing it, at the same time apply friction and warmth to the body, and dash cold water upon the head and face.

THE APPEARANCES WHICH GENERALLY ACCOMPANY DEATH ARE AS FOLLOWS:—

1, The breathing is absent, there is no movement of the chest, no air can be heard passing in and out of it, and there is no

watery vapor proceeding from the mouth. To determine the presence of respiration place a glass of water on the chest and watch if any movement is communicated to it; also hold a looking-glass or some bright surface to the mouth and see if the surface becomes dimmed by vapor condensing upon it.

2, The heart's action has stopped, there is no pulse, the movements and sounds of the heart have ceased.

To determine this, tie a ligature tightly round a finger. If there is any circulation the end of the finger will become reddened and the string will leave a white ring round the finger.

3, The eyelids are generally half closed and the pupils are dilated.

4, The coldness and pallor of the surface of the body increase.

V.—Poisons and their Immediate Treatment.

DEFINITION.—Poisons may be defined as substances which (when introduced into the body or applied externally) injure health or destroy life.

CLASSIFICATION.—Poisons may be classed as follows:—

1. CORROSIVES.—These soften and destroy the parts with which they come in immediate contact. As examples of corrosive poisons may be mentioned—the mineral acids, the caustic alkalies, corrosive sublimate, the acid, alkaline and corrosive salts (chlorates of zinc, tin and antimony, nitrate of silver, sulphate of potassium and carbonate of potassium), oxalic acid, etc.

2. IRRITANTS.—These cause inflammation of the part (usually the alimentary canal) to which they are applied. As examples of irritant poisons may be mentioned—arsenic, the salts of zinc, and other metals, elaterium, the essential oils, Spanish fly.

3. NARCOTICS.—These act briefly upon the nervous system, producing stupor, delirium, convulsions or coma. As examples of narcotic poisons may be mentioned—opium, prussic acid, belladonna, chloroform, chloral, alcohol, the poisonous gases, etc.

4. NARCOTIC-IRRITANTS.—These combine more or less the characters of narcotics and irritants. As examples of narcotic-irritants may be mentioned—strychnia, aconite, hemlock, poisonous fungi, etc.

EVIDENCE OF POISONING IS AFFORDED BY THE FOLLOWING CIRCUMSTANCES, *viz.:*—

(1,) By the *sudden appearance* of the general symptoms of poisoning, such as vomiting, purging, cramps in the limbs, pains in the stomach or bowels, delirium, unconsciousness, etc., in a person otherwise healthy, or soon after partaking of food, drink or medicine.

(2,) By *several persons* being attacked with similar severe symptoms, soon after a meal of which all have partaken.

(3,) By the *nature of the surroundings, i. e.,* by finding a glass or bottle with suspicious looking contents, by the smell of the room, etc.

(4,) By the *history of the case, i. e.,* by the patient having previously shown a suicidal tendency, or the signs of mental depression, etc.

HOW TO ACT IN CASE OF POISONING:—

(i,) Send at once for medical assistance, and take care that the doctor is made acquainted with the fact that the case to which he is summoned is one of probable poisoning.

(ii,) During the absence of skilled attendance, act as follows, *viz.:*—

(*a,*) *If you are in doubt as to the nature of the poison taken,* adopt the general treatment applicable to a case of unknown poisoning (*see below*).

(*b,*) *If you are aware of the nature of the poison taken,* adopt the general treatment applicable to the special poison (indicated in the table given below).

THE GENERAL TREATMENT APPLICABLE TO A CASE OF UNKNOWN POISONING.—Here the objects to be aimed at in treatment are:—

(i,) To *get rid,* if possible, of the unabsorbed poison from the system; this is effected, either by administering an *emetic* to bring the poison up, or an *aperient* to pass the poison through the alimentary canal.

(ii,) To *counteract depression and shock,* by giving stimulants and nourishments, and by the application of warmth by means of poultices, hot fomentations, etc.

(iii,) To *relieve pain,* by administering sedatives and demulcents.

EMETICS.—The following may be used:—

Sulphate of Zinc, grs. xx to xxx in half a tumbler of warm

water; this is prompt and safe, but is not to be given if salt and water has been already administered.

Ipecacuanha Powder, grs. xv to xxx in half a tumbler of warm water; this produces very little depression and does not irritate the stomach.

Ipecacuanha Wine, 1 to 2 tablespoonfuls in an equal quantity of water; this produces a good deal of depression and is not very prompt in its action.

Mustard, a tablespoonful in a tumbler of warm water.

Salt, two tablespoonfuls in a tumbler of warm water. This is not to be given after sulphate of zinc.

Tepid Water, in large draughts, followed by irritation of the back of the throat by means of the finger or a feather.

Any of the above emetics may be repeated once or twice if necessary. The action of an emetic is facilitated by giving plenty of tepid water.

It is important to remember that patients suffering from narcotic poisoning are *not easily* made to vomit.

CAUTION.—Emetics are not to be given in cases of *corrosive poisoning,* which is indicated by stains on the fingers, the lips, in the mouth, etc.

APERIENTS.—The following may be given:—

Castor Oil, 1 to 2 tablespoonfuls for a dose.

Sulphate of Magnesia (Epsom Salts), a tablespoonful in a tumbler of warm water; to be repeated if necessary.

STIMULANTS.—Administer:—

Sal Volatile (Aromatic Spirits of Ammonia), one-half to a teaspoonful in a tablespoonful of warm water.

Spirits (Brandy or Whisky), from a tea to a tablespoonful, according to circumstances.

Strong Beef Tea, Tea, or Coffee.

The Hot and Cold Douche alternately.

Note.—It may (in cases where the patient is unable to swallow) be necessary to give spirits, beef tea, tea or coffee by an enema.

SEDATIVES AND DEMULCENTS.—These are non-irritating fluids (which soothe internal local irritation and relieve pain), such as milk, raw eggs, barley water, arrowroot, flour mixed in water, olive oil, linseed tea, gruel, etc.

THE POISONS.

Special Poisons	Their Symptoms	Their General Treatment
1. THE ACIDS— (*a*) The strong corrosive ones, viz.:— (i,) Acetic (Glacial, and Aromatic Vinegar). (ii,) Hydrochloric (Muriatic, Spirits of Salt). (iii,) Nitric (Aqua fortis). (iv,) Sulphuric (Oil of Vitriol).	Immediate burning pain in the mouth, throat and stomach, vomiting and purging may occur. Wherever the skin and mucous membrane are touched they are destroyed, there is more or less suffocation and great shock.	CAUTION. — *Emetics are not to be given.* Administer frequently magnesia or chalk dissolved in warm water, then demulcents, such as lime water and milk, milk and egg, olive oil, ¼ pint to 1 pint of water, thick gruel; if there is depression, give stimulants. If any acid has got into the air passages, make the patient inhale the fumes of ammonia.
(v,) Carbolic (Phenol).	With the above symptoms there is the voidance of greenish or black urine, and the odor of the acid can be detected in the breath.	Administer Epsom salts, ½ oz. in 8 ozs. of warm water, then white of egg mixed with water in large quantities, or large quantities of milk, or olive oil, 2 to 4 ozs. in 1 pint of water, or castor oil, 1 oz.; also give stimulants freely and apply warmth to the extremities.
(vi,) Oxalic (Salts of Lemon or Sorrel).	Burning pain in the stomach, cramp in the leg, vomiting of dark colored fluid, a hacking cough with a feeling of constriction in the throat, the mouth is white and sore, there is great shock, and death may rapidly supervene.	Avoid giving *potash, soda,* or *ammonia,* or their *carbonates,* but administer frequently chalk and water, magnesia and water, and lime water, and then give 1 oz. of castor oil, and stimulants freely.

Special Poisons	Their Symptoms	Their General Treatment
(*b*) PRUSSIC ACID (Hydrocyanic Acid, Scheele's Acid), this may also occur in oil of almonds, almond flavor, peach kernels, bitter almond water, laurel water, and cyanide of potassium.	The patient almost immediately after swallowing the acid becomes insensible, with fixed and glistening eyes, the pupils are dilated and insensitive to light, the limbs are flaccid, the skin is cold and covered with a clammy perspiration, the respirations are gasping, and occur at long intervals, and there may be convulsions.	Administer emetics first, then stimulants freely and *ad lib.*, and if necessary by an enema, make the patient smell the fumes of ammonia, apply the hot and cold douche alternately, perform artificial respiration (about 20 to the minute), and keep it up steadily, and at the same time use friction to the extremities. NOTE.—If life can be maintained for about half an hour, recovery is almost certain.
2. ACONITE (Monkshood, Blue Rocket) and its alkaloids; occurs in aconite liniment, neuraline, etc.	There is warmth at the pit of the stomach, tingling of the mouth, lips and tongue, a feeling of constriction in the throat, difficulty in swallowing, numbness of the tips of the fingers, loss of sensation, deafness and dimness of sight; this is followed by paralysis, first of the lower and then of the upper extremities, the pulse is irregular and almost imperceptible, the respirations are shallow, feeble and infrequent, there may be convulsions, the pupils are generally dilated, there is great prostration, and death may take place quite suddenly after some slight exertion.	Give emetics first, then stimulants freely, apply warmth to the lower extremities, by hot water bottles and by friction with the warm hand. Apply a mustard poultice or a mustard leaf over the heart, keep the patient strictly in the recumbent position and perform artificial respiration if necessary. NOTE. — Stimulants may have to be given by an enema.

Special Poisons	Their Symptoms	Their General Treatment
3. ALCOHOL, as in rectified, proof, and methylated spirit, brandy, rum, whisky, gin, etc.	Giddiness, inability to stand or walk, the gait is tottering, the expression is vacant, the face is flushed, the conjunctivæ are congested, the lips are livid, the breath smells of alcohol, the skin is covered with sweat, the pupils are dilated and fixed or contracted, convulsions occur, stupor and coma.	Give emetics; if the patient is insensible rouse him and keep him awake, administer hot strong coffee, apply the hot and cold douche alternately; when the patient has sufficiently recovered, wrap him up in warm blankets and put him to bed.
4. THE ALKALIES, the strong caustic ones, viz.:— (i), Ammonia (Spirits of hartshorn, etc.), as in caustic ammonia, ammonia liniment, compound camphor liniment, liquid ammonia. (ii,) Lime, as caustic lime, quicklime. (iii,) Potash, as caustic potash. (iv,) Soda, as caustic soda.	Immediate burning pain in the mouth, throat and stomach, vomiting and purging, the mucous membrane of the mouth is destroyed, and there are symptoms of suffocation and of great shock.	CAUTION.—*Emetics are not to be given,* but administer vinegar, lemon or orange juice, tartaric or citric acid in plenty of water; give demulcents and stimulants if required; if the power of swallowing is lost, give inhalations of acetic acid or vinegar from a pocket handkerchief.
5. ANTIMONY, as chloride or tartarated antimony (tartar emetic), occurs also in antimonial wine, and in specifics.	There is a metallic taste in the mouth, with nausea and incessant vomiting, a feeling of heat, constriction and choking in the throat, pain in the stomach, violent purging, and cramps in the limbs, the skin is cold, the head and face are congested and there is great depression and collapse.	Encourage vomiting by giving large draughts of tepid water, when the vomiting subsides administer strong tea or coffee, also white of egg mixed in water, barley water, arrowroot or milk. Give stimulants if there is collapse. Wrap the patient up in warm blankets and put hot water bottles to his feet.

Special Poisons	Their Symptoms	Their General Treatment
6. ARSENIC (Arsenious acid, White arsenic), may also occur in Aqua Tofana, fly papers, mineral, Vienna and other emerald green, rat paste, vermin killer, cheap ices, crayons, French chalks, wall papers, and tinned fruits, (as an impurity of the tin).	Faintness and depression followed by a burning pain in the stomach, vomiting of brown matter mixed with mucus and streaks of blood, purging, severe cramps in the calves of the legs, constriction and dryness of the throat, great thirst, hiccough, loss of voice, cold sweats, profound shock and exhaustion.	Give emetics, and then large draughts of tepid greasy or soapy water, or salt and water, dialysed iron in 1 oz. doses, or magnesia in large quantities, these are to be frequently repeated; give olive oil ½ pint in 1 pint of lime water, administer demulcents; if there is depression, give stimulants freely, and apply warmth and friction; after the acute symptoms have passed off, apply linseed meal poultices to the abdomen.
7. BELLADONNA (the Deadly Nightshade) and its alkaloid atropine.	Heat and dryness of the mouth and throat, suppression of saliva, difficulty of swallowing and great thirst, the face is flushed, the eyes are prominent and sparkling, the vision is double or indistinct, the pupils are dilated and insensible to light, there is great excitement and noisy delirium, the gait is unsteady and staggering, there is a frequent desire to pass water, with inability to do so, the skin is dry and there may be a rash like that of scarlet fever.	Give emetics first, then strong hot coffee and stimulants, apply mustard to the calves of the legs and hot water bottles to the feet, administer the hot and cold douche alternately, and perform artificial respiration.

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Special Poisons	Their Symptoms	Their General Treatment
8. CANTHARIDES (Spanish Fly, Blister Beetle), occurs also in blistering fluid.	Burning sensation in the throat and stomach, with pain and difficulty in swallowing, vomiting of mucus and blood, diarrhœa with blood and slime in the motions, incessant desire to pass water, high temperature, quick pulse, headache, loss of sensibility, convulsions.	Give emetics and then demulcents, especially white of egg and milk or thick gruel, but avoid giving *fats* and *oils;* when the acute symptoms have been relieved, give the patient a hot bath or apply hot linseed meal poultices to the abdomen.
9. CAMPHOR, as in the essence, liniment and spirits of camphor.	Odor of the breath, languor, giddiness, faintness, disturbance of vision, noises in the ears, delirium and convulsions, a cold and clammy skin, weak pulse and difficult breathing.	Give emetics and then stimulants freely, apply warmth to the extremities and administer the hot and cold douche alternately.
10. CAUSTIC, LUNAR (Nitrate of silver).	Pain and discoloration of the mouth and throat, followed by vomiting of whitish flaky matter which turns black.	Give common salt dissolved in water or milk freely, give emetics (but not sulphate of zinc), and demulcents.
11. CHLORAL (Chloral hydrate, Syrup of chloral).	Deep sleep, with loss of muscular power, diminished sensibility, the face is livid and bloated, the pulse is slow or very weak, the respirations are diminished, and the surface of the body is cold.	Give emetics, wrap the patient up in warm blankets, and apply hot water bottles to the feet, keep the patient roused by shouting or flapping his face with a wet towel, give hot strong coffee, and perform artificial respiration if there is the slightest failure of the breathing.
12. CHLORINE GAS, as in chloride of lime.	Irritation of the throat, cough, tightness of the chest, difficulty of breathing and inability to swallow.	Admit plenty of fresh air, give inhalations of steam or of very dilute ammonia.

Special Poisons	Their Symptoms	Their General Treatment
13. CHLOROFORM (inhaled).	The respirations are arrested, the breathing is stertorous, and the face is livid.	Pull the tongue forward, see that the mouth and throat are clear, loosen everything tight about the chest, flap the face and chest with a wet towel, give plenty of fresh air, apply the hot and cold douche alternately to the chest and head, and perform artificial respiration.
14. CHLOROFORM (swallowed).	The breath smells of chloroform, the gait is staggering, this is followed by insensibility, the pupils are dilated, the breathing is stertorous, the skin is cold and the pulse is imperceptible.	Give emetics first, then carbonate of soda dissolved in plenty of water, rouse the patient in every possible way, apply mustard to the calves of the legs and a mustard leaf over the heart.
15. COPPER, as the sulphate (blue vitriol, blue stone), or the acetate (verdigris).	There is a metallic taste in the mouth, constriction in the throat and gullet, griping and colicky pains in the abdomen, nausea, vomiting and purging, difficult breathing, quick pulse, great weakness and thirst, cold perspiration, coldness of the limbs, headache, giddiness, and finally coma.	First give large quantities of milk and eggs, then emetics (if there is no vomiting), and then large draughts of tepid water, after that barley water, arrowroot or gruel, and apply hot linseed meal poultices to the abdomen.
16. CROTON OIL.	Great pain in the abdomen, with vomiting and purging, the face is pale, the features are pinched, the pulse is small, the skin is moist, and there is great collapse.	Give emetics first, then demulcents, especially white of egg in milk, and stimulants freely, and apply hot linseed meal poultices to the abdomen.

Special Poisons	Their Symptoms	Their General Treatment
17. ERGOT OF RYE and its alkaloids, ergotine, etc.	Tingling and cramp of the limbs, dizziness, weakness, itching vomiting and diarrhœa.	Give emetics first, then castor oil, after that strong tea and stimulants, keep the patient in a recumbent position, and apply warmth to the extremities.
18. ETHER (inhaled).	Same as chloroform inhaled.	Same as chloroform inhaled.
19. FUNGI (Fly fungus, poisonous mushrooms).	There is violent colic, with vomiting and diarrhœa, great excitement and then coma, the pulse is slow, the breathing is stertorous, the pupils are dilated, and the extremities are cold.	Give emetics first, then castor oil 1 oz., then stimulants freely, apply warmth to the extremities and hot linseed meal poultices to the abdomen.
20. THE GASES, *viz.*, carbonic acid or carbonic oxide gas, coal gas or sewer gas, choke damp or after damp, marsh gas, charcoal fumes, and acetylene.	There is irritation of the throat, with headache, drowsiness, giddiness, and singing in the ears, loss of muscular power, lividity, hurried respirations and coma.	Remove quickly to the fresh air, and perform artificial respiration, apply smelling salts to the nostrils, and cold to the head and chest, and give stimulants.
21. HOLLY BERRIES.	There is vomiting, with pain in the head and abdomen, and purging, the pupils are contracted, then drowsiness followed by unconsciousness and collapse supervene.	Give emetics, and then stimulants freely, apply friction and warmth to the extremities.
22. HYOSCYAMUS (henbane), and its alkaloids hyoscyamine, etc.	Much the same as belladonna, *i.e.*, thirst, dilated pupils, delirium, etc.	Give emetics first, then stimulants moderately, and apply the hot and cold douche alternately.

Special Poisons	Their Symptoms	Their General Treatment
23. IODINE and IODOFORM.	Pain and heat in throat and stomach, with vomiting and purging (the vomited matter yellow or blue), followed by giddiness and faintness with convulsions.	Give emetics first, then starch and water, or gruel and water, or white of eggs and water freely.
24. LABURNUM and its active principle cytisine, which is also present in Arnica.	There is purging, vomiting, and great restlessness, this is followed by drowsiness, insensibility and convulsive twitchings.	Give emetics first, then stimulants in moderation, and administer the hot and cold douche alternately to head and chest.
25. LEAD as acetate (sugar of lead), lead paint or white lead; may occur in crayons, French chalk and hair dyes.	There is dryness of the throat, with a metallic taste and great thirst, colicky pains in the abdomen which are relieved by pressure, constipation, cramps in the legs, cold sweats, paralysis of lower extremities, convulsions.	Give emetics freely, then Epsom salts (½ oz in a tumbler of warm water), then demulcents, and apply hot linseed meal poultices to the abdomen.
26. MERCURY, as corrosive sublimate, perchloride of mercury, red and white precipitate, red oxide of mercury, and the acid nitrate of mercury.	If corrosive sublimate or the acid nitrate is taken, the lips and mouth are white and swollen, the tongue is white and shrivelled, and there is a sense of constriction in the throat; in all cases of poisoning by mercury there is a metallic taste in the mouth, pain in the stomach, nausea, vomiting of stringy mucus mixed with blood, profuse purging with bloody stools, a cold and clammy skin, difficult respirations, syncope and convulsions.	First give white of egg mixed with water or flour and water, then give emetics freely, after this demulcents and stimulants.

Special Poisons	Their Symptoms	Their General Treatment
27. MUSSELS, also PTOMAINES (animal alkaloids, poisonous meat, poisonous fish).	There is uneasiness and weight at the pit of the stomach, a sensation of numbness in the extremities, heat, dryness and constriction in the throat, thirst, shivering, difficulty of breathing, cramps in the legs, inflammation of the eyes, colic, vomiting and purging, itching of the skin, failure of the heart's action and collapse.	Give emetics first, then castor oil 1 oz., then stimulants freely, apply hot water bottles to the feet, and wrap the patient up in warm blankets.
28. NITROUS OXIDE GAS (laughing gas).	Same as chloroform inhaled.	Same as chloroform inhaled.
29. NITRO-BENZOL (nitro-benzine, artificial oil of bitter almonds, essence of henbane). Also present in aniline dyes, liqueurs, sweetmeats, pomades.	There is weakness and discomfort, great nausea and anxiety, confusion of the mind, lividity of the face and body, dilated pupils and convulsions.	Give emetics first, then stimulants freely, apply the hot and cold douche alternately, and perform artificial respiration.
30. NUX VOMICA (St. Ignatius' bean), and its alkaloid STRYCHNIA (as in vermin killer).	Violent rigid convulsions, with lockjaw during the convulsive attack; the eyeballs are prominent, the pupils dilated, the respirations impeded, and the pulse feeble and very rapid. Death usually takes place either from asphyxia or from collapse during a paroxysm.	Give emetics first, then animal charcoal *ad lib.* mixed in water, followed by an emetic; if possible perform artificial respiration.

Special Poisons	Their Symptoms	Their General Treatment
31. OPIUM (laudanum) and its alkaloids (morphine, codeine, etc.), occur in tincture and wine of opium, sedative solutions, Chlorodyne, Carminative, Cordial and Elixirs, Mother's Friend and Soothing Syrups, Syrup of Poppies, Paregoric and many kinds of patent medicines.	Mental excitement, followed by headache, uneasiness, a sensation of weight in the limbs, incapacity for exertion, sleepiness, diminution of sensibility, and contraction of the pupils; at first the patient can be roused with difficulty, but later on he becomes quite insensible, his muscles are relaxed, his skin is cold, the pupils fail to respond to light, his face and lips are cold and blue, the respirations are slow, irregular, and stertorous, and the pulse is weak and compressible.	Give emetics first, rouse and keep the patient awake in every possible way, by making him walk about, or flapping him with a wet towel, apply ammonia or sal volatile to the nostrils, give a pint of hot strong coffee, apply the cold douche to the head frequently, perform artificial respiration and keep it up at least for two hours. *Do not* give wine or brandy. CAUTION.—In making the patient walk about be careful not to overexhaust him, as with opium poisoning there is always a certain amount of depression.
32. PARAFFIN OIL.	The symptoms vary very much, there may be a burning sensation in the mouth, gullet or stomach, and great thirst; the extremities are cold, the face is pale, the pulse is feeble, the respirations are weak, and often there is coma.	Give emetics first, then stimulants freely, and apply warmth to the body.
33. PHOSPHORUS (as in matches, phosphorus paste, rat poison, vermin killer, rat paste).	Pain in the stomach, vomiting, the vomited matter may be luminous in the dark, odor of phosphorus in the breath, bleeding from the nose, blood stained motions, and convulsions.	Give emetics first, then Epsom salts (½ oz. in a tumbler of water), stimulants if required, and demulcents, especially milk. *Avoid* giving *fats* and *oils*.

Special Poisons	Their Symptoms	Their General Treatment
34. TIN and its salts.	The same as in lead poisoning.	Give emetics first, then sal volatile in water, and white of egg in milk.
35. TOBACCO and its alkaloid, nicotine.	Nausea and vomiting, accompanied with great weakness and faintness, confusion of ideas, dimness of sight, weak pulse, cold skin, covered with clammy perspiration, pupils at first contracted and then dilated.	Give emetics first, then strong tea, and stimulants freely, apply warmth to the extremities and keep the patient in a recumbent position.
36. TURPENTINE (oil and spirits of turpentine, turps, camphene).	Odor in the breath, intoxication, pupils contracted, breathing stertorous, coma, collapse and tetanic convulsions, irritability of the bladder, the urine having the smell of violets. The symptoms of turpentine poisoning resemble somewhat those of opium.	Give emetics first, then Epsom salts (1 oz. in half a tumbler of warm water), and demulcents.
37. ZINC, as sulphate (white vitriol), and chloride (Disinfecting Fluid).	Corrosion of the lips and of the mucous membrane of the mouth, pain and incessant vomiting, the pulse and respirations are quickened, the pupils are dilated, the muscles are paralyzed, and coma supervenes.	Do not give *emetics*, but give first large draughts of milk and white of egg, and then bicarbonate of soda or common soda in large quantities dissolved in warm water, and then strong tea, apply linseed meal poultices to the abdomen.

Note.—The following Poisons are frequently taken either accidentally or for suicidal purposes, viz.. *Carbolic acid, Oxalic acid, Prussic acid, Arsenic, Opium, Phosphorus, Strychnia* (Nux vomica), *Lead* (*Sugar of*), and *Mercury* (*Red and White Precipitate*).

VI.—The Immediate Treatment of Insensibility and Fits.

Insensibility.

Loss of consciousness may be produced by the following *causes:*—

1, Syncope, or fainting.
2, Asphyxia, or suffocation.
3, Shock and collapse.
4, Concussion of the brain.
5, Compression of the brain.
6, Apoplexy.
7, Alcoholic intoxication.
8, Narcotic poisoning, as opium poisoning.
9, Sunstroke.
10, Freezing.

Unconsciousness is also present in the following:—

1, Epilepsy.
2, The convulsions of infants.
3, Uræmic poisoning, which often comes on in the course of kidney disease and is due to the non-excretion (by the kidneys) of the waste material in the blood.

But as convulsions form the most prominent symptom, these diseases are dealt with separately under "Fits."

1, SYNCOPE, or FAINTING, may be due to mental emotion, pain, extreme exhaustion (as from hunger, fatigue, etc.), hemorrhage, cold, heat (particularly if combined with a close atmosphere, as in heated rooms, in large crowds, etc.), constriction of the chest (as in tight lacing, etc.), and organic disease of the heart.

Symptoms.—Fainting is generally ushered in by a feeling of giddiness and fluttering at the heart. This is followed by the face becoming suddenly pale and the lips white; the pulse becomes weakened and the breathing quickened; a cold sweat appears on the brow and the palms of the hands; the patient staggers and finally falls to the ground in an unconscious state. Rarely convulsive movements of the whole body may also be present.

TREATMENT.—As fainting is caused by a diminution of the supply of blood to the brain from partial paralysis of the heart, the object to be aimed at in treatment is to restore the cerebral circulation; therefore, when a person has fainted, do not attempt to place him in a sitting or standing posture (as this will only embarrass the already weakened action of the heart, and may be fatal), but lay him flat on his back, or, better still, on his left side with his pelvis and feet slightly raised; loosen all tight clothing about his body and neck; give him plenty of fresh air; sprinkle cold water on his face, apply smelling salts to his nostrils; when able to swallow, give him a glass of water or a little brandy, whisky, or sal volatile mixed in water, and keep him in the recumbent position for some time after he has recovered. If the faint is prolonged and consciousness does not return, send for medical assistance, but in the meanwhile apply warmth to the feet and a hot mustard plaster over the region of the heart, and if natural breathing has not returned, perform artificial respiration by the "Sylvester" method (page 187).

In a crowded room a fainting fit may be prevented by placing the patient in a stooping position on a chair and bending his head between his knees. The person must be held, for if he faints in this position he dives forward on to his head, and may turn a somersault or might break his neck. If the patient has completely fainted this treatment is not to be attempted, as it only helps to obstruct the circulation and respiration.

2, ASPHYXIA.—This has been dealt with on page 190.

3, SHOCK, or COLLAPSE, may be produced by severe injuries or emotional disturbance, causing a profound depressing effect upon the central nervous system.

The injuries most liable to produce shock are:—

(i,) Those involving large surfaces of the skin, as in burns and scalds.

(ii,) Those causing crushing or tearing of the body, as machinery and railway accidents.

(iii,) Those affecting the abdomen and viscera.

Loss of blood and exposure to cold intensify the condition of shock.

Symptoms.—A person in a state of shock presents the following appearance: He lies flat on his back, his limbs are flaccid, and he makes no spontaneous movements; his body is cold and clammy, his face is pale, his eyes are sunken, his pulse is small,

feeble and irregular, his respirations are shallow, feeble and sighing, his temperature falls to 97° F. or a degree or two lower, and he is semi-unconscious.

Should a case of shock tend to terminate favorably, the condition known as that of "Reaction" comes on. This is usually ushered in by the patient vomiting, the pulse then becomes stronger, the body warmer, and color returns to the face.

TREATMENT.—The object to be aimed at in treatment is to bring about reaction by the application of warmth and the administration of stimulants. Therefore, to treat shock place the patient in bed between blankets as soon as possible, keeping his head quite low. Apply hot water bottles to his feet and between his thighs, and apply friction to his arms and legs.

If able to swallow, give him small quantities of hot stimulants, and frequently repeat them till reaction takes place, then lessen the stimulants considerably, taking care not to over stimulate.

During the state of collapse, should the breathing become embarrassed, perform artificial respiration according to the "Sylvester" method (page 187).

4, CONCUSSION OF THE BRAIN is caused usually by blows or falls upon the head, or falls upon the feet or lower end of the spine, the effect being a severe shaking up of the brain substance.

Symptoms.—These vary in their severity according to the force of the blow applied.

The patient may present the appearance of being merely stunned, or he may be in a condition identical with that already described under "Shock."

TREATMENT.—The same as for shock; and at the same time apply cold in the form of ice or wet cloths to the head. Avoid alcoholic stimulants, but give instead hot beef tea or hot coffee, and keep the patient absolutely quiet in a darkened room.

5, COMPRESSION OF THE BRAIN is caused by injuries to the head producing pressure of the brain substance either by the depression of a piece of bone onto it, or by a blood clot (produced by the rupture of a blood-vessel).

Symptoms.—Resemble those of apoplexy, which see.

TREATMENT.—If there is a wound on the head, dress it; otherwise adopt the same treatment as for apoplexy.

6, APOPLEXY is caused by the bursting of a diseased blood-vessel into the substance of or upon the surface of the brain,

causing compression of that organ. It usually occurs in elderly persons.

Symptoms.—Just before the attack there are generally some premonitory symptoms, such as headache, giddiness, especially on stooping, weight and fulness in the head, noises in the ears. When the actual attack occurs, the patient is more or less unconscious, his face is flushed, his breathing is shallow and stertorous; his eyes are insensible to light and touch, the pupils are fixed, and are either unequally dilated, or one or both may be contracted; his pulse is full and slow, and there is paralysis more or less affecting one side of the body.

TREATMENT.—The object of treatment is to get the circulation quiet and the heart's action free from embarrassment; therefore loosen all tight clothing about the neck and chest, put the patient to bed with his head raised, and apply cold to it; apply hot water bottles to his feet and mustard poultices to the calves of his legs. Be careful to give nothing by the mouth (as it may choke the patient), and send for medical assistance.

7, ALCOHOLIC INTOXICATION:—

Symptoms.—A person in a state of stupor from alcohol presents the following picture: He is semi-unconscious, and can be partially roused, his face is flushed and bloated, his eyes are reddened and blood-shot but are not insensible to touch, his pupils are equally dilated and fixed, his lips are livid, his breathing is slow, the surface of his body is cold, and he may smell of liquor.

Note.—Alcoholic stupor may be hard to distinguish from apoplexy, but the state of the pupils, the sensitiveness of the eyes to touch, and the presence or absence of paralysis will help to determine the condition.

TREATMENT.—(See "Poisons," page 199.)

CAUTION.—If in doubt as to whether a person is suffering from drunkenness or apoplexy, treat him for the latter and be particularly careful *not to make him vomit.*

8, NARCOTIC POISONING.—(See "Opium Poisoning," page 206.)

9, SUNSTROKE is caused by exposure to the rays of the sun.

Symptoms.—Sunstroke is ushered in with giddiness, nausea, and weakness; this is followed by drowsiness and more or less unconsciousness. The eyes are blood-shot, the skin is hot and

dry, the breathing is quick and noisy; the pupils are contracted at first and become dilated afterwards; the pulse may be slow or quick, and there may be convulsions.

TREATMENT.—Place the patient in a cool, shady spot; remove the clothing from the neck and upper part of the body and raise the head; douche the head, neck, chest and spine with cold water, or wrap cold sheets round him, and continue these cold applications till he becomes conscious, then remove him to bed, keep the room darkened, and watch him carefully; if the unconsciousness returns, renew the application of cold.

10, FREEZING:—

TREATMENT.—Take the patient into a room which has no fire in it, rub the body with ice-cold or snow water and restore warmth gradually.

It is dangerous to apply heat too early; as soon as the patient is able to swallow give him stimulants and hot drinks.

TEST FOR INSENSIBILITY.—To determine whether a person is insensible, raise the eyelid and touch the white of the eye, blinking, which can not be avoided if the person is conscious, does not occur.

HOW TO ACT IF A PATIENT IS FOUND IN A STATE OF UNCONSCIOUSNESS.—Before efficient help can be rendered, the first thing to do, is to try and arrive at the cause which has produced the state of unconsciousness, and in order to do this a systematic examination of the patient and his surroundings must be made, therefore proceed as follows:—

(i,) Notice position of the body and its surroundings.

(ii,) Notice whether the body is lying still or there are convulsive movements.

(iii,) If possible obtain all information as to the cause.

(iv,) Lay the patient on the back, inclining the head to one side (to prevent the tongue from falling back or vomited matter going down the trachea); if the face is flushed slightly raise the head, if the face is pale keep the head flat, place the arms by the sides and extend the legs, and loosen all tight clothing about the neck and chest.

(v,) Examine the head, to ascertain whether there is a depressed wound (which would suggest compression), or a mere bruising (which would suggest stunning).

(vi,) Examine the eyes to see if they are sensitive to light and touch, if there is any squinting, and the state of the pupils;

(*a*,) If sensitive to touch, no brain injuries are present.

(*b*), If the pupils are unequally contracted there is brain trouble.

(*c*,) If the pupils are equally contracted, there is opium poisoning.

(vii,) Examine the face;

(*a*,) If it is drawn to one side, this will indicate apoplexy or compression of the brain.

(*b*,) If it is bloated and flushed, this will suggest the excessive use of alcohol.

(viii,) Smell the breath, the odor of opium or alcohol may be detected.

(ix,) Examine the mouth and tongue, froth in the mouth and a bite on the tongue will indicate fits, particularly epileptic.

(x,) Notice the breathing;

(*a*,) If it is slow, it indicates great weakness as in shock.

(*b*,) If it is snoring (stertorous), it indicates brain trouble.

(xi,) Examine the pulse;

(*a*,) If it is slow, there is brain trouble.

(*b*,) If it is rapid, there is sunstroke or fever.

(*c*,) If it is quick and thready, there is great weakness—such as shock.

(xii,) Feel the surface of the body;

(*a*,) If the skin is abnormally cold, there is either freezing, intoxication, collapse, or fainting.

(*b*,) If the skin is hot, there is sunstroke or high fever.

(xiii,) Examine the ribs, collar bones and limbs for fractures.

(xiv,) Examine the limbs to see if there is any paralysis; this is done by raising the limbs and allowing them to fall, if they do so lifelessly it suggests paralysis.

(xv,) If convulsive movements are present, the patient is subject to fits of some kind (either epileptic, hysterical or uræmic in an adult, or convulsions of infants).

Fits.

1, EPILEPTIC FITS.—The distinguishing features of these fits are convulsive movements and unconsciousness. An epileptic fit begins by the patient suddenly falling unconscious, with strained and rigid muscles; as he is seized he may utter a sharp, shrill cry or yell. This stage of rigidity is then succeeded by

a stage of convulsions in which the patient's body is thrown into violent twitchings and contortions with foaming at the mouth. During this stage the tongue may be bitten. After the patient has been in the convulsive stage for a few minutes, he may at once regain his consciousness or he may be more or less confused for a time, or more frequently he becomes drowsy and passes into a deep sleep or stupor, which may last several hours.

TREATMENT.—During the convulsive stage place the patient in a safe place to prevent him from hurting himself; put a piece of wood or other hard substance well padded between his teeth to prevent him from biting his tongue, loosen all tight clothing about the neck, chest and abdomen, and *do not* attempt to restrain the convulsive movements or to administer anything by the mouth.

After the convulsive stage has passed off and the patient seems drowsy, encourage natural sleep. If on waking he seems exhausted, give him a little soup or beef tea, but do not give stimulants.

2, HYSTERICAL FITS.—These occur more often in females than males and are ushered in with crying, sobbing or laughing without any cause; then follow jerky movements of the limbs (not truly convulsions), at the same time the breathing is quickened, the eyelids are closed, and in severe attacks the patient falls down apparently but not actually unconscious, taking care never to hurt herself.

TREATMENT.—The best treatment for hysterical patients is to exclude all fussy friends and let them alone. The patient will come to herself when she realizes that her condition is exciting no sympathy or alarm.

3, THE CONVULSIONS OF INFANTS.—These are usually caused by teething, constipation, indigestion, worms, etc., but they may be due to fever or brain disease.

Symptoms.—Just before the occurrence of a fit the child is usually peevish and fretful. During the fit the body first becomes stiff, the pulse is rapid and weak, the breathing is hurried, the skin is wet with a cold, clammy perspiration, and there is complete loss of consciousness. The rigidity of the body lasts a few seconds, and is succeeded by a stage of convulsive movements in which the muscles of the face twitch and the limbs jerk violently. As one fit passes off another may

supervene, or the child may pass into a semi-comatose condition and then into a natural sound sleep.

TREATMENT.—The course to adopt is to relieve as quickly as possible the cerebral circulation, therefore place the child at once in a bath as warm as can be borne comfortably from ten to twenty minutes, or put the feet in hot water with mustard in it; at the same time apply cold sponges to the head and quickly change them, and send for medical assistance.

4, URÆMIC CONVULSIONS.—In the course of Bright's disease convulsions and unconsciousness may occur.

TREATMENT.—The course to adopt here is to encourage the action of the skin, therefore place the patient in bed between warm blankets, pack hot water bottles round him, and send for medical assistance.

VII.—Burns and Scalds and their Immediate Treatment; Electric Shock and its Immediate Treatment; the Removal of Foreign Bodies from the Eye, Ear, and Nose.

Burns and Scalds.

BURNS are caused by the application of a fire or dry heat.

SCALDS are caused by the application of hot liquids or moist heat.

Burns are divided into the following *degrees,* according to the extent of injury inflicted, viz.:—

1st degree.—A mere reddening of the skin.

2nd degree.—The formation of blisters.

3rd degree.—Charring and destruction of tissues.

In addition to the actual damage caused by burns and scalds there is also present:—

(i,) *Shock to the System.*—This is in direct proportion to the superficial extent of the burn. Burns of the abdomen and chest are especially liable to produce marked shock, and in children suffering from burns and scalds the shock is usually profound.

(ii,) *Congestion of Internal Organs.*—This usually comes on after the shock.

TREATMENT.—In the management of burns and scalds the following points have to be borne in mind:—

(*a*,) The local injury.

(*b*,) The shock to the system.

If the shock is severe it should be treated first, and the local injury afterwards, when reaction has set in.

The Local Injury.—In attending to a burn care should be taken that the clothing is removed with the *utmost care* from the burnt part, and that no blisters are broken in removing it. The clothing should therefore be cut off, and if parts adhere to the body they should be gently removed after first soaking them in oil; if this is not sufficient, the part should first be immersed in a bath of warm water. If the burns are extensive only one portion of the body should be dressed at a time, the rest being kept covered up.

To dress the Burns proceed as follows: either apply over the burnt parts pieces of lint which have been soaked in carron oil (a mixture consisting of equal parts of linseed oil and lime-water), or in carbolic oil, 1 in 40, or in a saturated solution of common washing soda, or spread boracic acid ointment (which has been diluted with an equal part of vaseline) upon pieces of lint and apply it to the burnt parts.

Note.—Strong antiseptics for dressing burns should be avoided, and the dressings should not be changed too often.

BURNS FROM ACIDS.—First drench the parts with water, wash them with a solution made by dissolving washing soda in water, and then treat as for an ordinary burn.

BURNS FROM ALKALIES.—Drench the parts first with water, then wash with a solution of dilute vinegar and water, and finally treat as for an ordinary burn.

TO EXTINGUISH THE FLAMES FROM BURNING CLOTHING.—Throw the person down whose clothes are on fire, and cover him up as quickly as possible with a rug, coat, shawl, blanket or other article of covering.

Shock by Electricity.

This may be produced by:—

(i,) *Natural Electricity.*—As lightning.

(ii,) *Artificial Electricity*—As currents from telegraph, telephone, electric lighting and motor wires.

NATURAL ELECTRICITY.—The effects of lightning vary according to circumstances; there may be only *slight shock* with dizziness, or there may be *violent convulsions, insensibility* or immediate *death.*

ARTIFICIAL ELECTRICITY.—The danger of a current of electricity is in proportion to its intensity—thus, the low tension currents of the telephone and telegraph wires would probably only produce *slight shock,* while the high tension currents (and especially the alternating ones), for lighting and motor purposes are extremely dangerous.

The current from a dynamo may be 10,000 volts, for arc lamps the current is usually 2,400 volts, and for lighting (in houses) 100 volts.

A current of 100 volts would be very dangerous, a current of from 20 to 30 volts is as much as can be comfortably borne by a strong man.

When electric wires have a current passing through them, they are termed *live wires,* and it is from these that there is danger, as they may be exposed either by accident or for repairs.

Symptoms.—A person taking hold of naked live wires (*i. e.,* those that are not covered with an insulating material), with a current of high tension passing through them, would most likely be *violently convulsed and be unable to let go,* or there might be *insensibility* with suspended animation or even *death.* Parts of the body or clothes in contact with the wires may be scorched or burnt.

TREATMENT.—Here proceed as follows:—

(i,) Remove the sufferer from the source of danger; this must be done with the greatest care, or the person giving assistance may himself receive the shock and be rendered incapable.

"When the injured person retains his hold of the wire, it is dangerous to touch any part of him, even the parts of the body covered by clothes." A case of this kind is recorded in the *Electrical Review*—"While a man was cleaning an electric street lamp in Boston, he received a shock and was killed, his body being suspended from the wires; a man who endeavored to remove the body came in contact with the current and was dashed to the ground with such violence that he died shortly afterwards."

Therefore before removing the sufferer, first protect the hands

whenever possible with india-rubber gloves (these are used in electrical works and may be at hand), if these can not be procured, first wrap a mackintosh coat or a thick *dry* woolen cloth coat, or other *dry* article of clothing round the patient (damp articles of clothing are good conductors of electricity, and the sufferer's own clothes may be damp from perspiration), and then pull the sufferer away from the source of danger.

(ii,) Send at once for medical assistance, but in the meanwhile place the patient in a comfortable position, loosen all tight clothing round the body, and if there is any difficulty with the breathing begin at once to perform *artificial respiration.*

Two live naked wires of which the sufferer may have hold, may be *short circuited* by dropping (not placing, as then the assistant might get the shock), an iron bar or other metallic tool across them, in this way carrying the current from one wire to the other instead of through the body of the sufferer.

Removal of Foreign Bodies.

1. FROM THE EYE.—Foreign bodies may be removed from the surface of the eye as follows. If under the *upper* lid, first evert the lid by placing a bodkin or match over it, and then gently pull the lid over; in this way the whole of the upper surface of the conjunctiva is exposed and may be very gently swept over with a camel's hair brush, or with a piece of soft linen dipped in warm water.

If under *lower* lid, the whole of the conjunctiva under the lower lid may be exposed by gently pulling the eyelid down with a finger, and the foreign body removed as described above.

2. FROM THE EAR.—Great care should be taken in these cases not to poke any sharp instruments into the ear, as the drum might easily be injured; warm glycerine or oil may be poured into the ear and the organ gently syringed out with warm soapy water.

3. FROM THE NOSE.—The nose should either be blown forcibly, or gently syringed out with warm water, or the patient may be made to sniff pepper and sneeze.

VIII.—The Transport of Sick and Injured.

THE POSITION OF SICK OR INJURED PERSONS DURING TRANSPORT.—Patients may be removed in any of the following positions:—

1.—*The Sitting Position.*—This is to be adopted for patients who are slightly injured in the upper part of the body, and are without constitutional symptoms.

2.—*The Semi-Recumbent Position.*—This is to be adopted for those who are injured about the region of the chest, and are suffering more or less from shortness of breathing.

3.—*The Recumbent Position.*—This is to be adopted in all cases where persons have been dangerously injured about the head, chest or abdomen, also in fractures of the long bones, injuries to joints of the lower extremity, and in cases of faintness, shock and excessive hemorrhage.

Note.—Before a patient is removed, the necessary "First Aid" treatment should always be rendered, and the clothes about the chest should be loosened.

Preparation for the Reception of a Case of Accident or Sudden Illness.

While engaged in attending to a case of accident or sudden illness, if possible, send a messenger to the patient's house, in order that arrangements may be made for his reception.

1. SELECTION AND PREPARATION OF THE ROOM.

(i,) *Selection of the Room.*—The points to attend to are: that the room should be easily accessible, it should be large and lofty with a south or southwest aspect, the windows should admit sufficient light, and should be made to open top and bottom, and there should be a fireplace with a chimney that does not smoke.

(ii,) *Preparation of the Room.*—The room should be thoroughly cleansed (if time will permit of it), well ventilated by drawing down the top windows, a fire should be lighted in it, it should

be warmed to a temperature of 60° Fahr. and maintained at this, a thermometer being hung in the room for the purpose of regulating the temperature; the carpet and all superfluous furniture should be removed from the room.

2. THE BEDSTEAD AND BED.

(i,) *The Bedstead.*—Wide bedsteads are to be avoided, as the patient can not be easily got at; the best kind of bedstead to use is an iron one, 3 to 3½ feet wide by 6½ feet long, it should be placed away from the wall (so that it can be approached from either side), and if possible across the room between the door and fireplace with the head facing the window.

(ii,) *The Bed.*—Feather beds and flock mattresses are to be avoided, hair mattresses are the best; the bed clothes should be light and warm, no vallances or curtains should be used, and care should be taken that the space under the bedstead is vacant.

The bed should be made and the bed clothes well turned down, two stout chairs should be placed next to the bed, on which to rest the stretcher while the patient is being undressed. It may (in cases where the injuries are severe, or mud-stained clothes have to be removed or extensive dressings applied), be necessary to have a second bed or couch in the room on which to first lay the patient. Extra blankets and hot water bottles should be kept in readiness.

In cases of collapse the blankets should be made hot and flannel should be wrapped round the hot water bottles.

If there is any likelihood of the bedclothes being soiled, *i. e.,* in cases of extensive injury, or where dressings have to be applied, or where the patient is unconscious or extremely weak and passes his evacuations under him, a *draw-sheet* should be placed on the bed.

TO PUT ON A DRAW-SHEET—proceed as follows:—

Procure a large cotton sheet, fold it lengthways into four and place it across the bed so that it will reach from just below the patient's shoulders to his knees, now place a piece of mackintosh between the draw-sheet and the under sheet, the draw-sheet being about 4 inches wider than the mackintosh; one end of the draw-sheet is tucked in under the mattress, the other end is rolled up on the opposite side of the bed; when the part of the draw-sheet under the patient becomes soiled it is withdrawn a little to one side by being rolled up a little more.

In cases of fracture where the patient will have to lie in bed

for several weeks, it is important to have a properly arranged bed—termed a "fracture bed."

THE ESSENTIALS OF A "FRACTURE BED" ARE:—

(i,) That there should be no sagging or giving way;

(ii,) That the surface should be evenly smooth and comfortably elastic;

(iii,) That the foot of the mattress should be a little higher than the head.

The best way to arrange a fracture bed is as follows: first place a straw palliasse on the bedstead, then on the palliasse place two horsehair mattresses 3½ to 4 inches thick, and on the top mattress one blanket; to raise the bedstead place a thin board under the legs at the foot.

In fracture of the lower extremity or of the spine, there should be no bolsters or pillows for the head, but only a thin cushion, and boards should be placed across the bed under the mattress.

A *cradle* to take off the weight of the bed clothes may be necessary in fracture of the lower extremity, or sprain of the ankle joint; for a cradle, a cardboard box with the ends cut out, or a three-legged stool, may be used.

3. CARRYING THE PATIENT UPSTAIRS TO HIS ROOM.

Before removing the patient to his room, the hall and staircase should be cleared so as to allow sufficient room for those carrying him to pass.

The particular method to be adopted for carrying will depend in each case upon the nature and extent of the injury, and the condition of the patient.

A patient may be carried upstairs by—

(i,) A single bearer.

(ii,) By two bearers.

(iii,) On a stretcher. Here the head should go first, and the stretcher should be carried in the same manner as is laid down for carrying stretchers when loading wagons, the two bearers at the foot should take care to keep the stretcher as nearly horizontal as possible by raising it, or

(iv,) By placing the patient in a strong chair and carrying him up backwards, while a third person walks after the chair, helps to support it, and prevents the patient from falling out.

4. REMOVING THE CLOTHES.—Before putting the patient

to bed the clothes should be first removed, and great care should be taken in doing this; in serious cases it is better to remove the clothes by cutting them away.

In removing a coat from an injured arm, draw out the uninjured arm first, and in putting on anything put the injured arm in first.

In removing trousers from an injured limb rip up the outside seam.

In removing clothing in cases of burns and scalds, cut away the parts which are not adhering, and soak the adhering parts well with oil before removing them.

5. LIFTING THE PATIENT INTO BED.—This may be done as follows:

(i,) If the bed is narrow and there is room for the stretcher, place it on the floor with the head close to the foot of the bed, three bearers can then lift the patient head foremost over the foot of the bed.

(ii,) If the bed is wide, place the stretcher close alongside the bed, the patient's head corresponding to that of the bed. Nos. 1, 2 and 3 bearers place themselves on the far side of the stretcher, and No. 4 bearer on the near side; the patient is then lifted and supported on the knees of Nos. 1, 2 and 3 bearers, No. 4 bearer pulls away the stretcher and stands aside, while the other bearers lift the patient, stand up, and place him in position on the bed.

6. PREPARATION FOR SURGEON'S VISIT.—When summoning a doctor, inform him as far as possible of the nature of the case so that he may come prepared.

The following should be in readiness:—

Plenty of hot and cold water, clean towels and soap, and a receptacle for dirty water.

For Burns and Scalds.—A good supply of clean old linen, cotton wool, olive oil, "carron" oil and bandages.

For Hemorrhage.—Ice, sponges and plenty of water.

For Drowning.—Plenty of blankets heated before the fire and several hot water bottles, the sheets from the bed should also be removed.

If *poultices* and *fomentations* are required, plenty of boiling water, linseed meal, mustard, a small basin, a large spoon, olive oil, tow, flannel, a kitchen roller and two sticks or a large towel.

INDEX OF SUBJECTS.

PAGE

Abdominal Diseases 123
Absorbing Power of Colors (in Clothing) 61
Abstaining 32
Accidents 124
Adulterated Coffee and Tea. 44
Agony 74
Air 11, 24
Air as a Cause of Disease.. 14
Air Pressure 12, 20
Albumen 29, 31
Alcoholic Beverages 42
Alcohol, Poison for Children 95
Alcoholism 43, 163
Ales 43
Anima rationalis 89
Anomalies of Appetite 140
Antiseptics 16
Apoplexy 121
Asiatic Cholera 110, 119
Asphyxy 74, 76, 77
Atavism 121
Atmosphere 11

Bacteria 16, 27, 37, 109
Banting Cure 32
Baptism of the Child in the Womb 93
Baptism of the Fetus 90
Baptism of Infants 93
Barometer 12
Bathing 62
Beef 34
Beer 43

PAGE

Bending of the Spine (in School Children) 64, 67
Birth 92
Bread 40
Burial 74, 79
Burial Vaults 24
Burying Alive 77

Carbohydrates 29, 31
Carbonates 29
Care of the Child 94
Carbonic Gas 154
Celibacy 101
Cemetery 26, 82
Cereal Food 30
Cheese 39
Child at School Age 97
Childbed Fever 120
Chlorides 29
Chocolate 44
Cholera 38
Cholera Morbus 19
Climacteric Stage 131
Climate 17, 21
Clothing 47, 60
Coal Dust 151
Cocoa 43
Coffee 27, 44
Colored Undergarments Poisonous 62
Contagion, How to Protect School Children Against.. 69
Cremation 80, 81
Criminal Abortion 89

PAGE

Criminal Possibilities of Hypnosis 161
Crowded Rooms 18

Damp Walls 48
Death 74
Decomposition of the Buried Corpse 81
Delusions 131
Diet of the Sick 30
Diphtheria 110, 118
Diseases due to Occupations.149
Diseases of Cattle Transferable to the Human System 35
Diseases of the Respiratory Organs 122
Disinfection 116
Drinking Water .23, 27, 28 29
Drunkenness 164
Dwelling 47

Effects of Drunkenness 167
Eggs 28, 34, 39
Electric Light 50, 51, 72
Epidemics 71, 114
Epilepsy 141
Erotic Insanity 137
Ergot 40

Fasting 32
Fat 28, 29
Fever Patients 30
Fire Damp 54
Fireplace 53, 55
First Aid to the Injured: See Separate Index.
Fish 34
Flat Houses 49
Flour 40
Food 28, 34

PAGE

Foundlings 95
Freezing 20
Fruit 41
Fuel 53
Fusel Oil 42

Gases 154
Gout 43
Grave 84
Ground Air 24

Hallucinations 131
Headache 64
Healing Power of Climate.. 17
Heart Diseases 123
Heat Prostration 18
Heating 52, 72
Heating by Gas 55
Heating by Hot Air 56
Heating by Steam 56
Heating by Hot Water 56
Hemorrhages 92
Horseflesh 34
Hospital 71
Humidity of the Air 21
Hydrophobia 109, 114
Hygiene 11
Hygiene of Schools 63
Hygiene for Hot Days 19
Hygienic Requirements for Dwellings 47
Hypnosis 155
Hysteria 144

Illuminating Gas 24, 50, 51
Illusions 132
Illustriousness (insane) ...138
Immunity 112
Impedimentum Consanguinitatis 99

PAGE

Infection 17
Infectious Diseases 109
Infanticide 95
Infirmary 71
Inundations 49
Insanity 124, 136
Iron Dust 152

Kerosene 51
Kleptomania 139

Lead Colic 151
Leaden Pipes, Cause of Poisoning 27
Lighting 50, 72
Liquor 42

Malaria 22, 23
Mania 134
Man in Sickness.....107
Manners of Death 74, 79
Marshy Soil 25
Means of Contagion 111
Measles 110
Meat 28, 30, 34
Meat, How it Should be Kept 36
Melancholy 132
Mental Diseases 124
Mentally Weak Children .. 97
Mercury 150
Mesmerism 158
Milk 28, 30, 34, 37
Milk, Carrier of Contagion. 38
Miraculous Cures not Possible by Hypnosis 162
Monotonous Bill of Fare .. 30
Moral Depravity 140
Morbidity of Imagination ..135
Morphinism 172

PAGE

Mortality Among Inebriates.165
Mortality Among Religious Orders 104

Nervous Diseases 141
New Buildings not to be Occupied until Thoroughly Dry 48
Nursing the Sick 33
Nutrition 28, 32

Obesity 30-32
Origin of Man 87
Oxygen 13
Ozone 13

Paralysis due to Insanity ...138
Paranoia 135
Phosphates 29
Phosphorus 150
Playgrounds 65
Pork 34
Pork Measles 35
Potato Diet 30, 41
Predisposition 112
Preserving Meat 37
Preventive Measures 115
Privies 58, 65
Procuratio Abortus 88
Puberty 131
Pulse 27, 28

Raving Madness 135
Religious Insanity 137
Religious Orders 104
Russian Baths 18

Safety Devices 149
Scarlet Fever 38, 110
School Benches 66

PAGE

School Diseases 64, 69
Schoolhouse 64
Schoolroom 65
Scrofula 30
Short Sight in School Children 66
Sick-rooms 72
Signs of Death 74, 77
Smallpox 110, 113
Social Legislation 149
Soil 23
Somatic Diseases 108
Sources of Infection 110
Spices 45
Spring Water 25
Stimulants 42
Stone Dust 153
Stove 53
Stuttering 97
Suffocation 79
Suggestion 155
Sulphates 29
Sunstroke 19
Syphilis 89, 109

Tainted Meat, How to Know 36
Tapeworms 34
Tea 27, 44
Teeth 63
Temperature 13
Tobacco 45
Tobacco Dust 153
Transmutation 130
Trichinae 34
Trichinosis 35
Tropical Diseases 22
Tuberculosis ..30, 35, 110, 117
Tuberculous Cattle 35
Turkish Baths 18
Typhoid 38
Typhus 110

Underground Water 24

Vaccination 112, 113
Variety of Food 30
Veal 34
Vegetables 41
Veneric Diseases 109
Ventilation 50, 56, 57, 72

Water Closets in Schools.. 65
Water Supply 26
Weather 17
Wells 24-26
Wine 43
Witchcraft 126

First Aid to the Injured.

PAGE

Acetylene poisoning 203
Acids, acetic poisoning, etc.197
— aqua fortis poisoning...197
— arsenious poisoning 200
— carbolic poisoning 197
— carbonic poisoning 203
— glacial acetic poisoning..197
Acids, hydrochloric poisoning 197
— hydrocyanic poisoning..198
— muriatic poisoning 197
— nitric poisoning 197
— oxalic poisoning 197
— poisoning from 197

PAGE

Acid, prussic poisoning ...198
— sulphuric poisoning 197
Aconite liniment poisoning.198
Alcohol poisoning 199
— for wounds 182
Alcoholic intoxication 211
Alkalies, ammonia caustic poisoning 199
— — liniment poisoning ..199
— — liquid poisoning 199
— lime poisoning 199
— potash poisoning 199
— soda poisoning 199
Almond flavor poisoning ..198
Aniline dyes poisoning 205
Antimonial wine poisoning.199
Antimony poisoning 199
— chloride of, poisoning ..199
— tartarated, poisoning ...199
Aperients in poisoning 196
— castor oil as 196
— sulphate of magnesia as 196
Apoplexy 210
Aqua fortis poisoning 197
— tofana poisoning 200
Arnica poisoning 204
Aromatic vinegar poisoning.197
Arsenic, white, poisoning..200
Artificial respiration..178, 189
— — Hall's method ...187, 189
— — Howard's method.187, 188
— — Sylvester's method ...187
Asphyxia from blocking larynx 193
— — choking 193
— — drowning 191
— — hanging 193
— — poisonous gases 193
— — strangulation 193

PAGE

Atropine poisoning 200

Bed, for accidents 220
Bed-fracture, essentials of..221
Bedstead for accidents 220
Belladonna poisoning 200
Bites by mad dogs 184
— — snakes 183
Bitter almonds poisoning ..198
Bleeding from the nose 180
Blister beetle poisoning 201
— fluid poisoning 201
Blood, spitting 179
Blue rocket poisoning 198
— stone poisoning 202
— vitriol poisoning 202
Breathing, to restore from drowning 191
Burning clothing, to extinguish flames of 216
Burns and scalds 215, 222
— from acids 216
— — alkalies 216

Camphene poisoning 207
Camphor essence poisoning.201
— liniment poisoning..199, 201
— spirit poisoning 201
Cantharides poisoning 201
Carbolic acid poisoning 197
Carbonic acid gas poisoning 203
— oxide gas poisoning 203
Carrying and lifting patients.221
— of injured 219
Caustic, lunar, poisoning ..201
Chalks, poisonous 200, 204
Charcoal fumes, poisonous..203
Chloral hydrate poisoning.201
— syrup poisoning 201

PAGE

Chloride of lime poisoning..201
— of zinc poisoning 207
Chlorine gas poisoning 201
Chlorodyne poisoning 206
Chloroform inhaled, poisoning 202
— swallowed, poisoning ..202
Choke damp poisoning 203
Choking from accident 193
Clothes, removal of, in accidents 221
Clothing, burning, to extinguish flames of 216
Codeine poisoning 206
Collapse 209
Common salt for wounds ..182
Compound fracture, immediate treatment of 187
— — of tibia 185
Compression of brain 210
Concussion of brain 210
Convulsions 214
— of infants 214
— uræmic 215
Copper acetate poisoning ..204
— sulphate poisoning 204
Corrosive poisons 194
— sublimate poisoning 204
Crayons, poisonous ...200, 204
Cyanide of potassium poisoning 198
Cytisine poisoning 204

Deadly nightshade poisoning 200
Death, appearances accompanying in asphyxia ..193
Demulcents in poisoning ..196
Digital compression for hemorrhage 178

PAGE

Dislocations 184
Draw sheet, to put on 220
Drowning, treatment of apparent death from 190
— what things to prepare in case of 222

Ears, removal of foreign bodies from 218
Electricity 217
Emetics, caution as to 195
— for use in cases of poisoning 195
Epileptic fits 213
Ergot of rye poisoning 203
Ergotine poisoning 203
Ether poisoning 203
Eyes, removal of foreign body from 218

Fainting 208
Fire, to extinguish in clothes.216
Fits 213
Fly papers, poisonous 200
Foreign bodies, removal of.218
Fracture-bed, essentials of.214
Fracture, immediate treatment of a compound..187
— signs of 186
Fractures 185
— repair of 185
Freezing, treatment of 212
Fungi poisoning 203
— fly poisoning 203

Gases, carbonic acid poisoning 203
— — oxide poisoning 203
— coal gas poisoning 203
— laughing gas poisoning..203

PAGE

Gases, marsh gas poisoning.203
— sewer gas poisoning 203
Glacial acetic acid poisoning 197
Greenstick fracture, of radius 185

Hemorrhage 175
— arterial 175, 177
— articles required for controlling 222
— capillary 175
— causes of 175
— definition of 175
— "first aid" for 177
— immediate treatment ...175
— internal 178
— situation of 175
— varieties of 175
— venous 175, 176
Hair dyes poisoning 204
Hanging, asphyxia from ...193
Henbane poisoning 203
Holly berries poisoning 203
Hydrochloric acid poisoning.197
Hydrocyanic acid poisoning.198
Hyoscyamine poisoning 203
Hysterical fits 214

Ices, cheap poisonous 200
Infants, convulsions of 214
Insects, stings of 183
Insensibility 208
— test for 212
Intoxication, alcoholic 211
Iodine poisoning 204
Iodoform poisoning 204
Irritant poisons 194

Laburnum poisoning 204

PAGE

Laudanum poisoning 206
Laurel water poisoning 198
Lead poisoning 204
— acetate poisoning 204
— paint poisoning 204
— sugar of, poisoning 204
— white, poisoning 204
Lightning, effects of 217
Lime, caustic, poisoning ...199
— quick, poisoning 199
Liqueurs poisoning 205
Lungs, bleeding from 179

Matches poisoning 206
Mercury, acid nitrate, poisoning 204
— perchloride poisoning ..204
— red oxide of, poisoning..204
Monkshood poisoning 198
Morphine poisoning 206
Muriatic poisoning 197
Mushrooms, poisonous ...203
Mussels, poisonous 205

Narcotic poisons 194
Neuraline poisoning 198
Nicotine poisoning 207
Nitrate of silver poisoning..201
Nitric acid poisoning 197
Nitro-benzol poisoning 205
Nitrous oxide gas poisoning.205
Nose bleeding 180
— removal of foreign body from 218

Oil of almonds poisoning ..198
— — vitriol poisoning 197
Opium tincture poisoning ..206
— wine of, poisoning 206
Oxalic acid poisoning 197

PAGE

Paraffin oil poisoning 206
Paregoric poisoning 206
Peach kernels poisoning ...198
Phenol poisoning 197
Phosphorus poisoning 206
Poisoning, classification of..194
Poisoning, definition of 194
— depression from 195
— evidence of 194
— general treatment for ..195
— how to act in 195
— immediate treatment of..194
— pain, relief of, in 195
— shock from 195
— unknown, general treatment 195
Poisonous fish and meat ...205
Poisons, acetate of copper..202
— — — lead 204
— acids 197
— — acetic 197
— — arsenious 200
— — carbolic 197
— — carbonic 203
— — hydrochloric 197
— — hydrocyanic 198
— — nitric 197
— — oxalic 197
— — prussic 198
— — sulphuric 197
— aconite 198
— — liniment of 198
— ether 203
— after damp 203
— alcohol 199
— alkalies 199
— — ammonia 199
— — — caustic 199
— — — liquid 199
— — — liniment 199

PAGE

Poisons, alkalies, lime 199
— — — caustic 199
— — — quick 199
— — potash 199
— — — caustic 199
— — soda 199
— — — caustic 199
— almond flavor 198
— — oil 198, 205
— ammonia 199
— aniline dyes 205
— animal alkaloids 205
— antimony 199
— — tartarated 199
— antimonial wine 199
— aperients for—
castor oil, sulphate of magnesia (Epsom salts) 196
— aqua fortis 197
— — tofana 200
— arnica 204
— aromatic vinegar 197
— arsenic 200
— — white 200
— arsenious acid 200
— atropine 200
— bean, St. Ignatius' 205
— belladonna 200
— benzol 205
— berries, holly 203
— bites, mad dog and snake 183
— bitter almonds 198, 205
— blister beetle 201
— — fluid 201
— blue rocket 198
— — stone 202
— — vitriol 202
— brandy 199
— camphene 207

PAGE

Poisons, camphor 201
— — essence 201
— — liniment 201
— — spirits 201
— cantharides 201
— carbolic acid 197
— carbonic acid 203
— — — gas 203
— — oxide gas 203
— caustic ammonia 199
— — lime 199
— — lunar 201
— — potash 199
— — soda 199
— chalks, French 200, 204
— charcoal fumes 203
— choral 201
— — hydrate 201
— — syrup 201
— chloride of antimony 199
— — — lime 201
— chlorine gas 201
— chlorodyne 206
— chloroform, inhaled 202
— — swallowed 202
— choke damp 203
— coal gas 203
— codeine 206
— compound camphor liniment 201
— copper 202
— — acetate 202
— — sulphate 202
— corrosive acids 197
— — sublimate 204
— corrosives 194
— crayons 200, 204
— croton oil 202
— cyanide of potassium ..198
— cytisine 204

PAGE

Poisons, deadly nightshade.200
— demulcents for—
arrowroot, barley water, eggs (raw), flour and water, gruel, linseed tea, milk, olive oil 196
— dog bites 184
— emerald green 200
— emetics for—
ipecacuanha powder, ipecacuanha wine, mustard, salt, sulphate of zinc, tepid water 195
— enema for—
beef tea, spirits, tea (or coffee) 196
— ergot of rye 203
— ergotine 203
— essence of camphor 201
— — — henbane 203
— ether, inhaled 203
— fish poisonous 205
— fly fungi 203
— — papers 200
— French chalks 200, 204
— friend and soothing syrup, mother's 206
— fruits, tinned 200
— fungi 203
— gases 203
— — acetylene 203
— — after damp 203
— — carbonic acid 203
— — — oxide 203
— — charcoal fumes 203
— — chlorine 201
— — choke damp 203
— — coal gas 203
— — marsh gas 203
— — nitrous oxide 205

PAGE

Poisons, gases, sewer gas..203
— gin 199
— glacial acetic acid 197
— hair dyes 204
— hartshorn 199
— henbane 203
— holly berries 203
— hydrate of chloral 201
— hydrochloric acid 197
— hydrocyanic acid 198
— hyoscyamine 203
— hyoscyamus 203
— ices, cheap 200
— Ignatius', St., bean 205
— insect stings 183
— iodine 204
— iodoform 204
— irritants 194
— laburnum 204
— laudanum 206
— laughing gas 205
— laurel water 198
— lead 204
— — acetate 204
— — hair dyes 204
— — paint 204
— — sugar of 204
— — white 204
— lime, caustic 199
— — quick 199
— liniment, aconite 198
— — ammonia 199
— — belladonna 200
— — camphor 201
— liqueurs 205
— lunar, caustic 201
— mad dog bites 184
— matches 206
— mercury 204
— — acid nitrate 204

PAGE

Poisons, mercury, perchloride 204
— — red oxide 204
— — red and white precipitate 204
— methylated spirit 199
— mineral green 200
— monkshood 198
— morphine 206
— mother's friend and soothing syrup 206
— muriatic acid 197
— mushrooms 203
— mussels 205
— narcotic 194
— narcotic irritants 194
— neuraline 198
— nicotine 207
— nightshade, deadly 200
— nitrate of silver 201
— nitric acid 197
— nitro-benzine 205
— nitro-benzol 205
— nitrous oxide gas 205
— nux vomica 206
— oil of almonds 198
— — — — bitter 198
— — — turpentine 207
— — — vitriol 197
— opium 206
— oxalic acid 197
— oxide of mercury 204
— paint, lead 204
— paraffin oil 206
— paregoric 206
— paste for rats 200, 206
— peach kernels 198
— perchloride of mercury..204
— phenol 197
— phosphorus 206

PAGE

Poisons, phosphorous paste.206
— poisonous fish 205
— — meat 205
— — mushrooms 203
— pomades, as 205
— poppies, syrup of 206
— potassium cyanide 198
— proof spirit 199
— prussic acid 198
— ptomaines 205
— quick lime 199
— rat paste 200, 206
— — poison 206
— rectified spirits 199
— red oxide of mercury ...204
— — precipitate 204
— rum 199
— rye, ergot of 203
— St. Ignatius' bean 205
— salts of lemon 197
— — — sorrel 197
— sedatives for (see "demulcents" above) 196
— sewer gas 203
— silver nitrate 201
— snake bite 184
— soda, caustic 199
— soothing syrup, mother's.206
— Spanish fly 201
— spirit, methylated 199
— — proof 199
— — rectified 199
— spirits of camphor 201
— — — hartshorn 199
— — — salt 197
— — — turpentine 207
— stimulants for—
beef tea, coffee (or tea), cold and hot douches alternately, sal volatile

PAGE

(aromatic spirits of ammonia), spirits (brandy or whisky) 196
Poisons, stings of insects..183
— strong acids 197
— strychnine 205
— sugar of lead 204
— sulphate of copper 202
— sulphuric acid 197
— sweetmeats as 205
— syrup of chloral 201
— — — poppies 206
— — soothing 206
— tartar emetic 199
— tartarated antimony ...199
— tin 207
— — impurities of 200
— tincture of opium 206
— tinned fruits 200
— tobacco 207
— turpentine 207
— — oil of 207
— — spirits of 207
— turps 207
— verdigris 202
— vermin killer ..200, 205, 206
— Vienna green 200
— vitriol, blue 202
— — oil of 197
— — white 207
— wall papers 200
— whisky 199
— white arsenic 200
— — lead 204
— — precipitate 204
— — vitriol 207
— wine of antimony 199
— — — opium 206
— zinc 207
— — chloride 207

PAGE

Poisons, sulphate 207
Pomades, poisonous 205
Potash caustic poisoning ..199
Poultices and fomentations 222
Precipitate, red, poisoning.204
— white, poisoning 204
Preparation of sick room ..219
Prussic acid poisoning 198
Ptomaine poisoning 205

Quick lime poisoning 199

Radial, fracture of 133
Rat paste poisoning ..200, 206
Respiration, artificial 187

Salt, common for wounds.182
Salts of lemon poisoning ..197
— — sorrel poisoning 197
Scalds, immediate treatment of 215
Sedatives in poisoning 196
Shock 209
— from burns 215
Sick room, selection of 219
Snake bites 183
Soda caustic poisoning 199
Soothing syrup poisoning ..206
Spanish fly poisoning 201
Spirits (See Poisons)
Sprains 184
St. Ignatius' bean poisoning.205
Stimulants in poisoning cases 196
Stings of insects 183
Strangulation, asphyxia from 193
Strychnine poisoning 205
Styptics 176
Sulphuric acid poisoning ..197
Sunstroke 211

PAGE

Sweetmeats, poisonous 205
Syncope 178, 208
Syrup of poppies poisoning.206

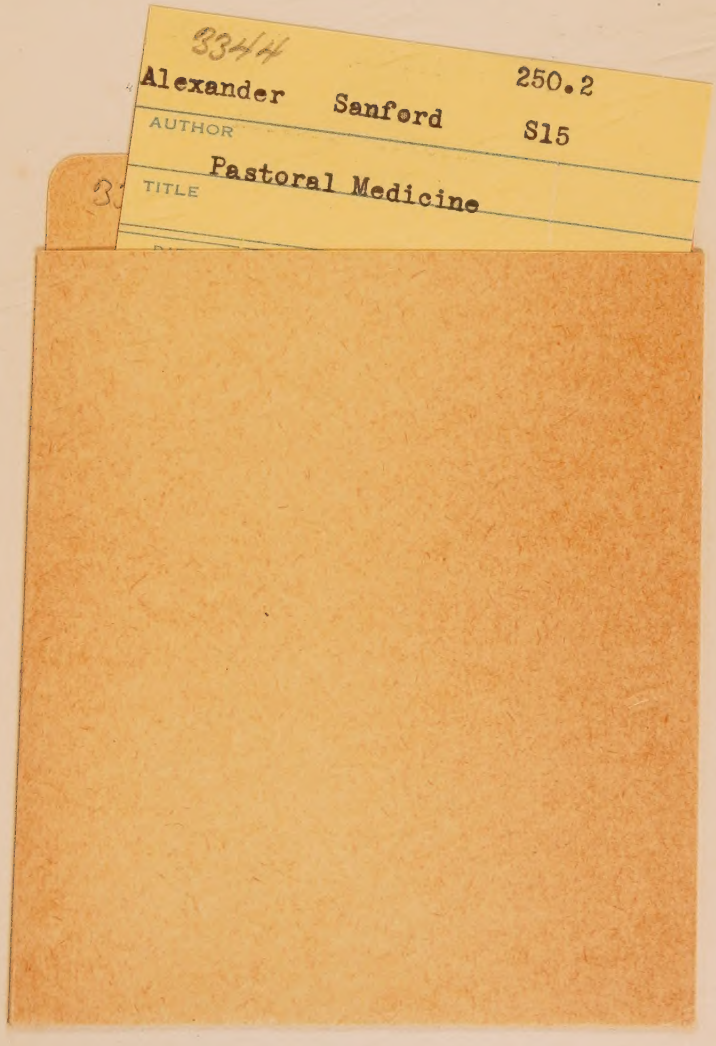
Tin, salts of, poisoning ...207
Tinned fruits poisoning 200
Tobacco poisoning 207
Transportation of injured person 186, 219
Turpentine poisoning 207

Unconsciousness, action in case of 211
Uræmic convulsions 215

Varicose vein, how to treat a burst 176
Verdigris poisoning 202
Vermin killer poisoning 200, 205
Vienna emerald green poisoning 200
Vitriol, blue, poisoning 202
— white, poisoning 207
Vomiting of blood 179

Wounds, bullet 181
— clean cut 181
— contused 183
— definition of 180
— immediate treatment of..181
— incised 182
— lacerated 181, 183
— poisoned 181, 183
— punctured 183
— simple 180
— stab 181
— to cleanse 181
— — dress 182

Zinc, chloride of, poisoning 207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